Dorsum – back

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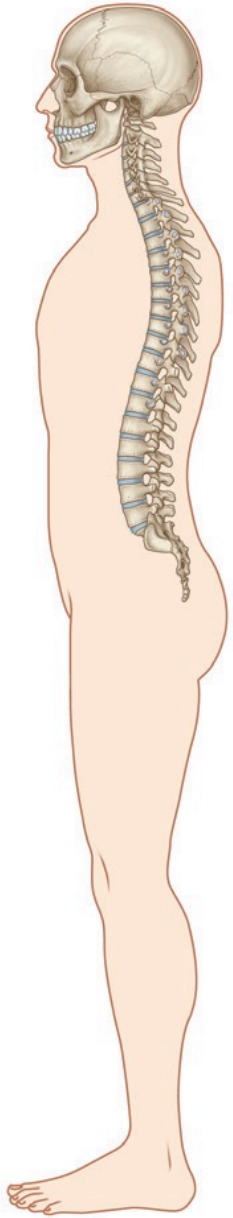
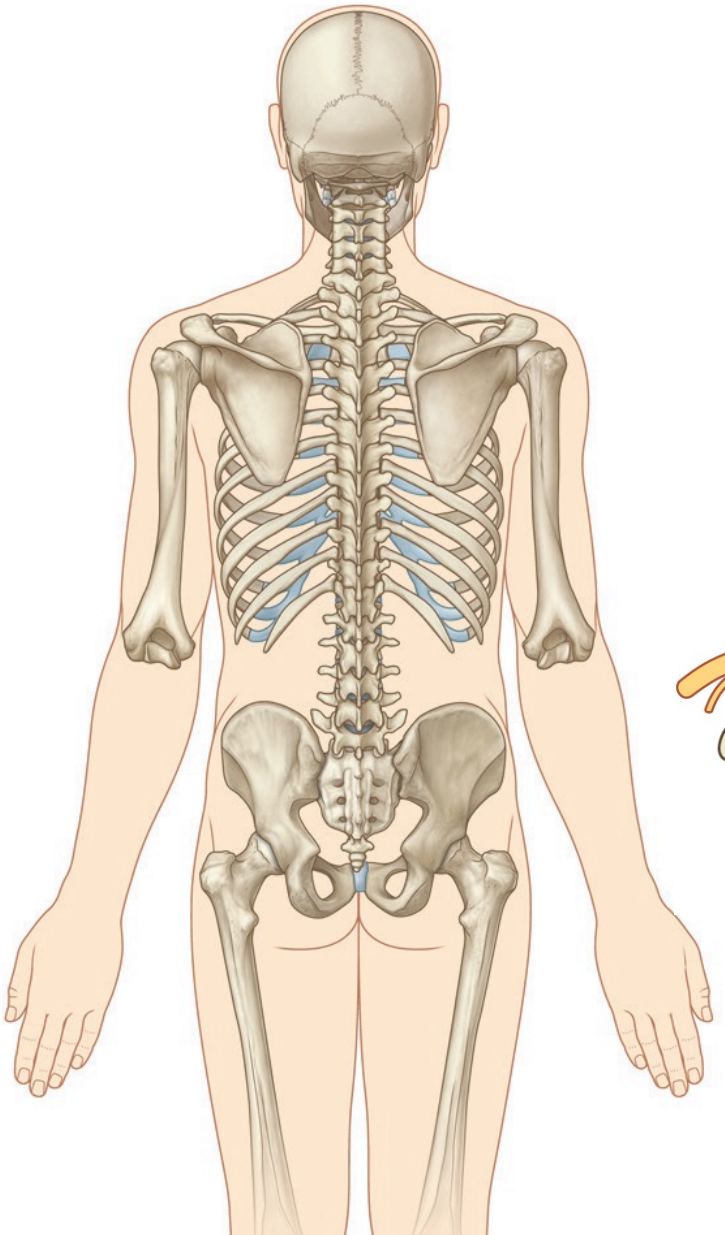
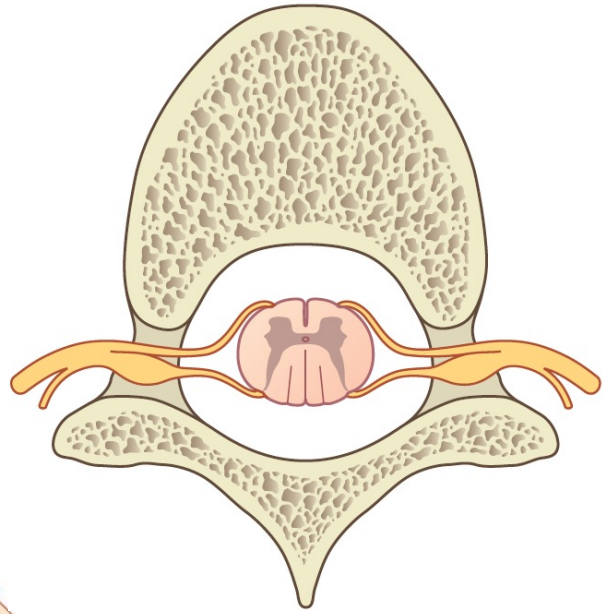
General concept

- **Dorsal part of hte trunk**
- **Muskuloskeletal axis of hte bod**
- **Body support**
- **Skeleton**
  - *vertebrae*
  - *Proximal parts of ribs*
  - *Base of the cranium*
  - *Partialy pelvic bones*
- **muscles**
  - *intrinsic*
  - *Exstrinsic - accesories*
- **Spinal cord and spinal nerves**
- **Vessels**

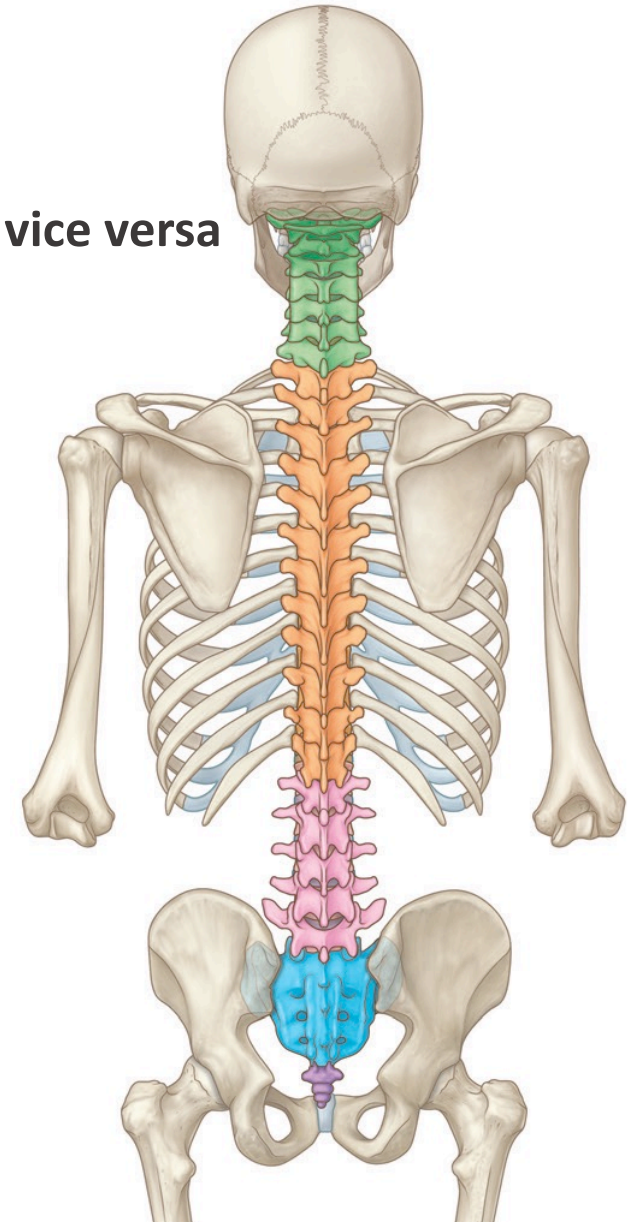


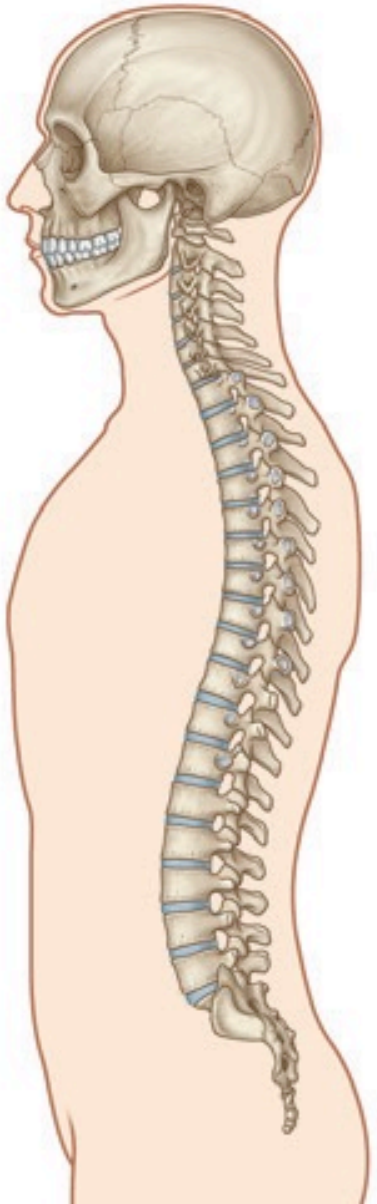




Dorsum – back

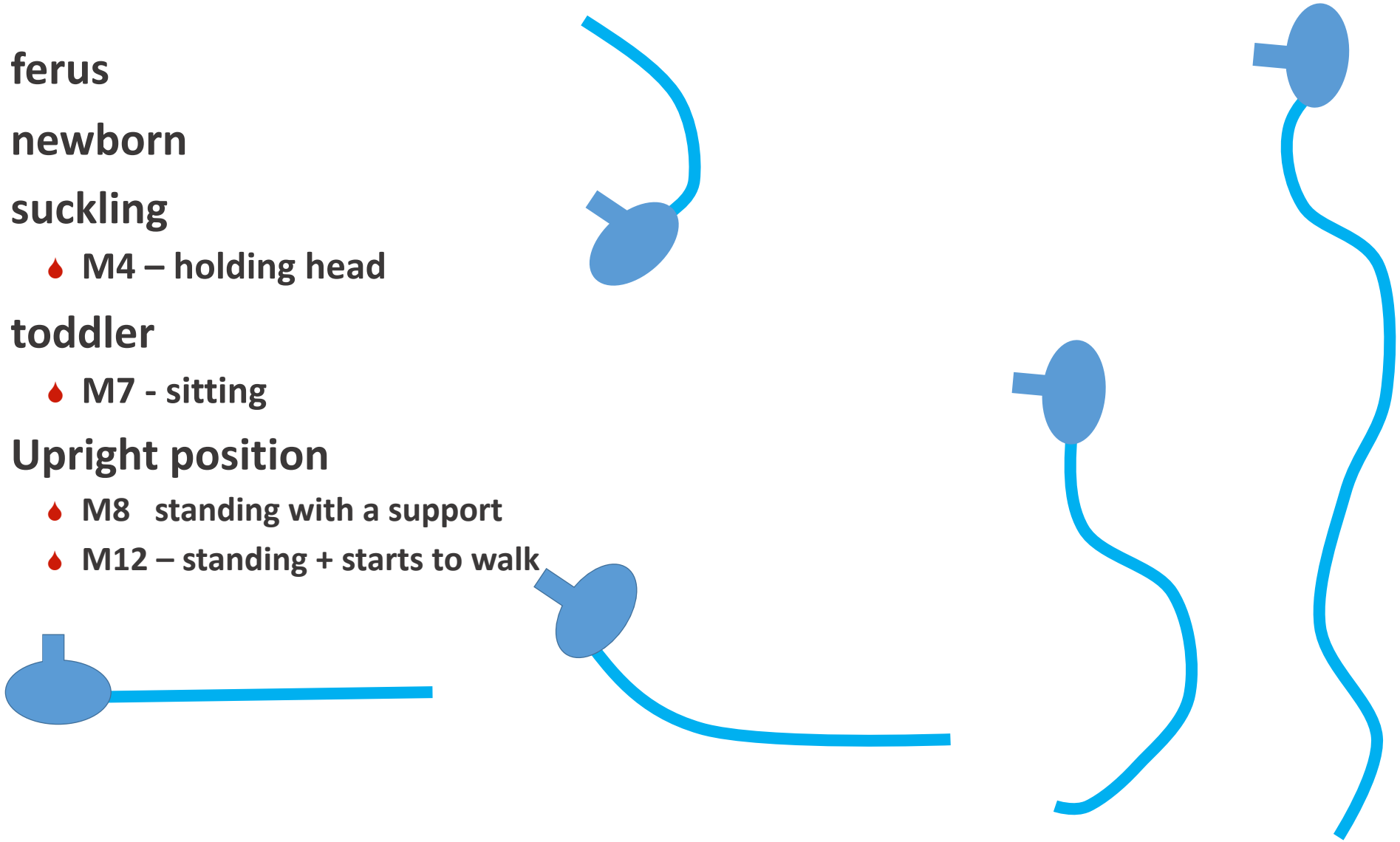
- Support
  - Bearing the weight
  - Forces transmition to extremeties and vice versa
  - Wearing the head
- Partes
  - Cervicalis
  - Thoracica
  - Lumbalis
  - Sacralis
  - Coccyx
- curves
  - kyphosis
  - lordosis
  - scoliosis





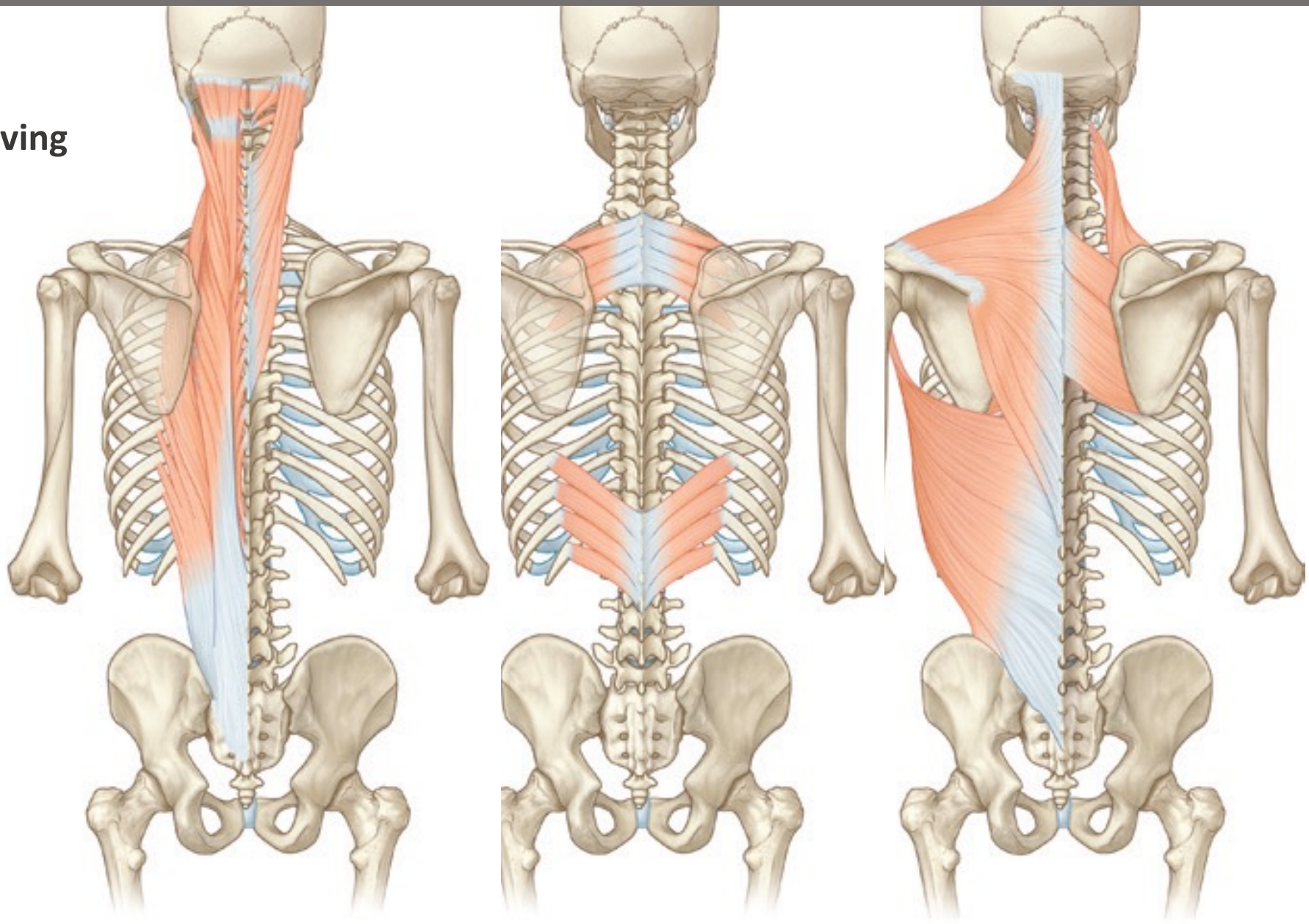
Kyphosis and lordosis

- ferus
- newborn
- suckling
  - M4 – holding head
- toddler
  - M7 - sitting
- Upright position
  - M8 standing with a support
  - M12 – standing + starts to walk

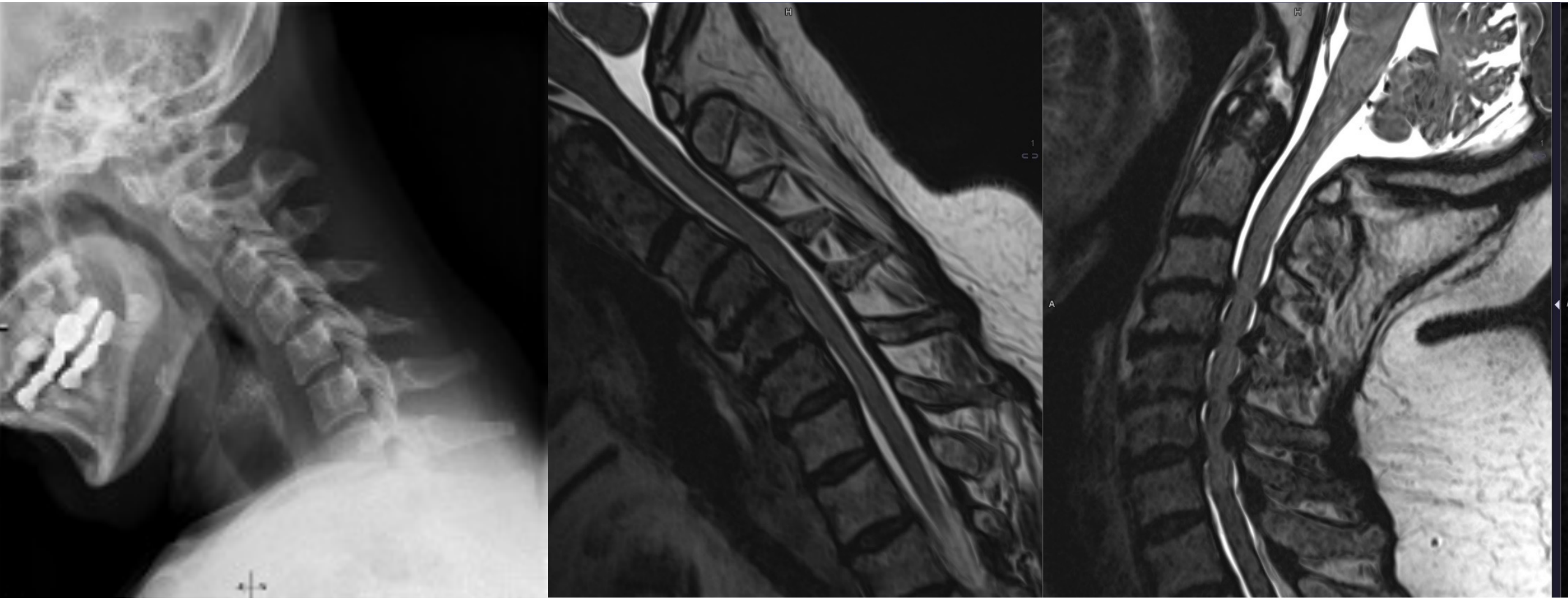


Motion

- **intrinsic mm**
  - Holding position and moving
  - flexion
  - Extension
  - Lateral flexion
  - rotation
- **extrinsic mm**
  - moving
  - Upper extremities
  - ribs

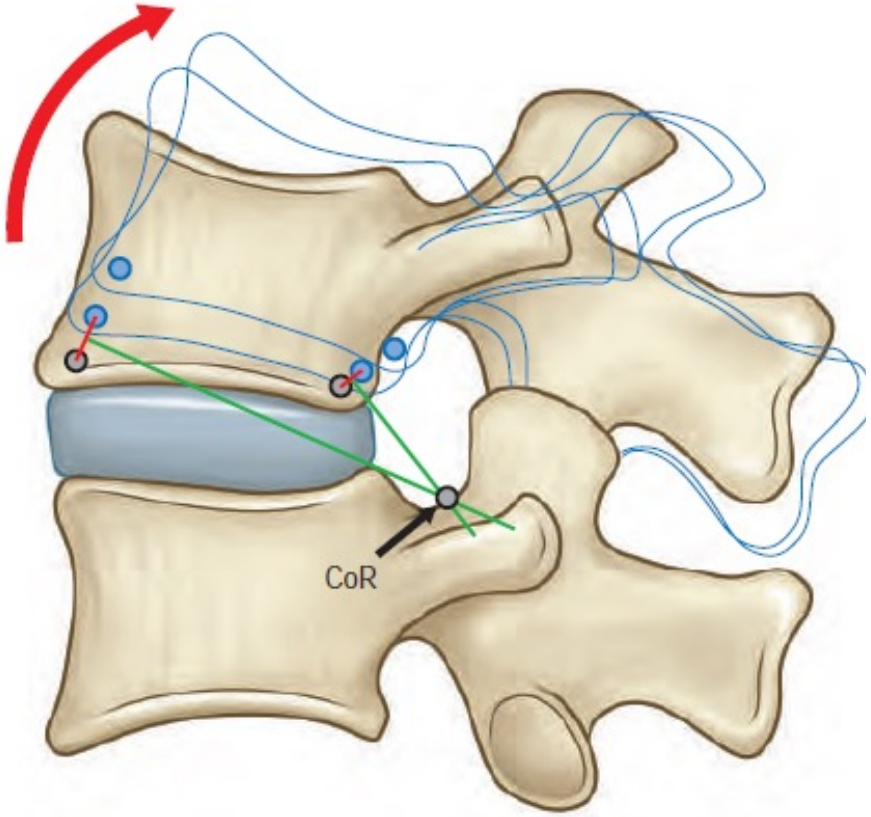


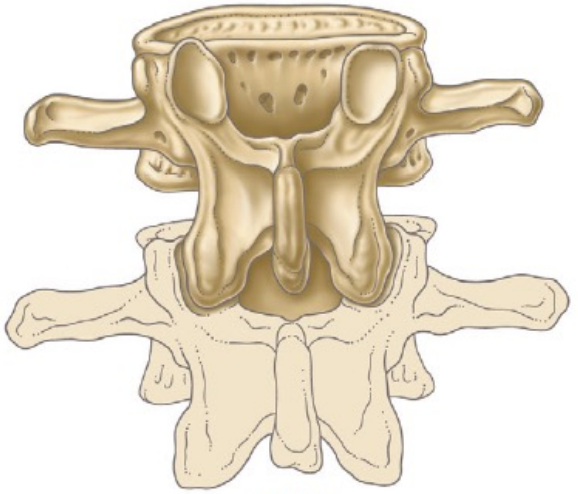
Flexion + extension

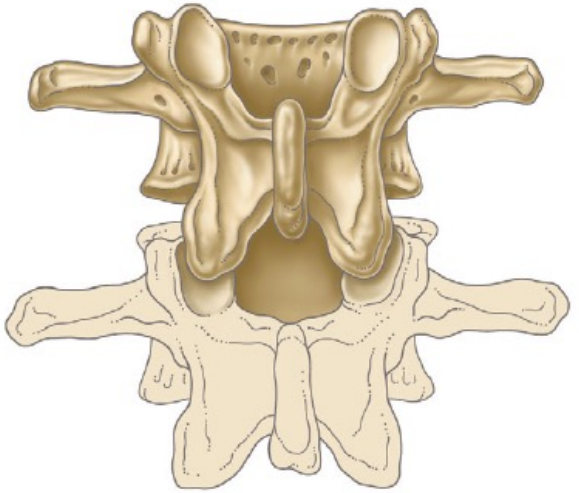


Motion between vertebrae

- **limited**
- **Addition of particular motion in segments**
  - *Small extent of motion in thoracici spine*
  - *Most movable lumbar*
- **Upper cervical - motion with head**
- **skul/C1 - flexion, extenion**
- **C1/2 head rotation**




Extension


Flexion

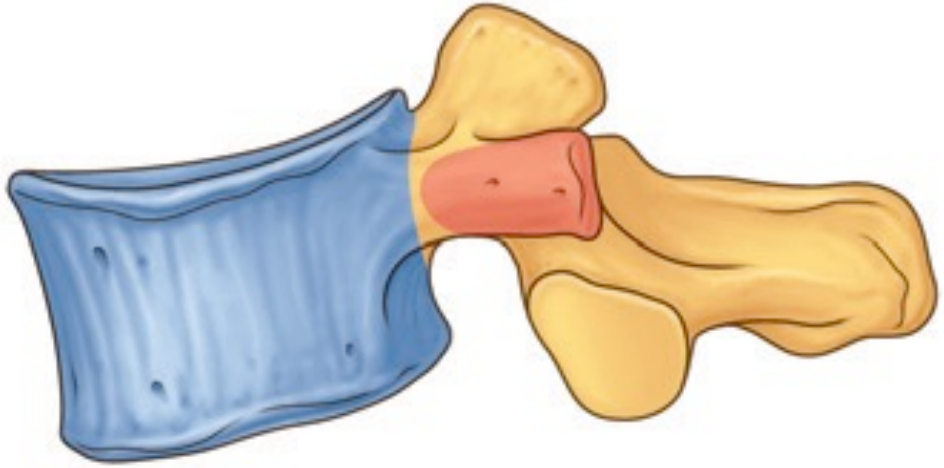

Seat-belt injury

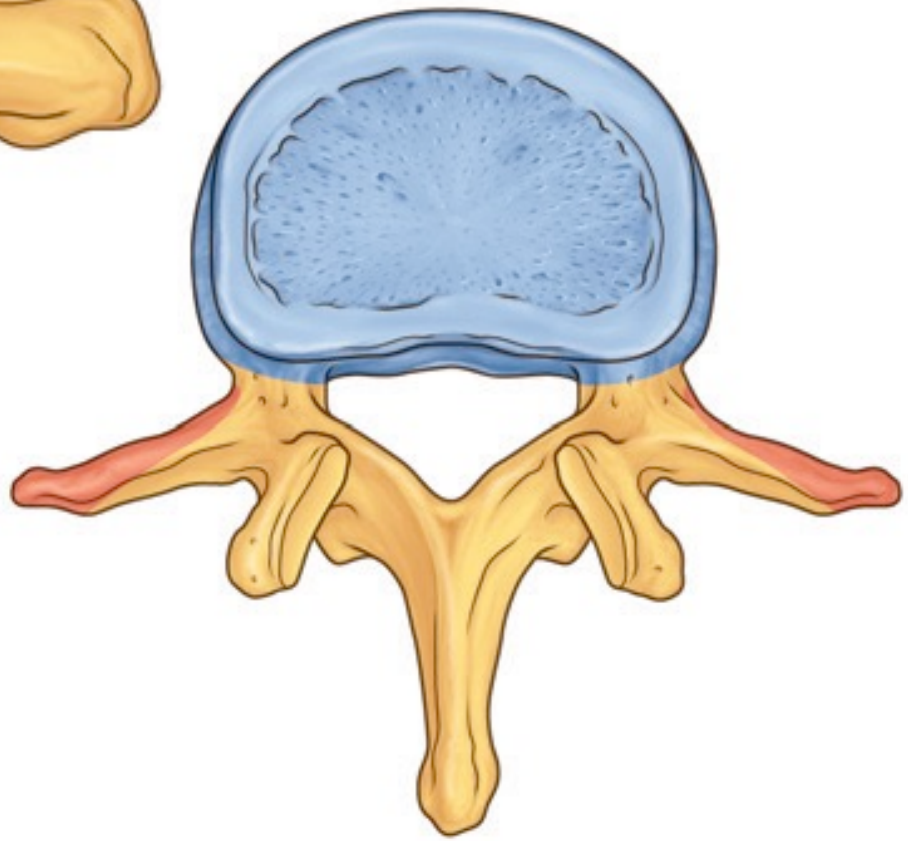
Ossa dorsi

- **Vertebra, vertebrae, columna vertebrarum**
- **Vertebrae cervicales**
  - **7 x**
- **Vertebrae thoracicae**
  - **12 x**
- **Vertebrae lumbales**
  - **5 x**
- **Os sacrum**
  - **5 x - synostosi**
- **Os coccygeum**
  - **3-4 x - synostosis**
- Segmentation disorders

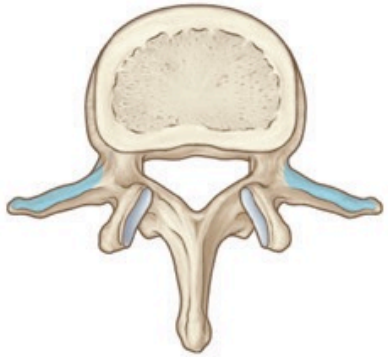
Geenral vertebral shape

- **Corpus vertebrae**
  - **Discus intervertebralis**
- **Arcus vertebrae**
  - *Pediculus*
  - *Lamina*
- **Processus vertebrae**
  - *Processus transversi*
    - *Žebra a jejich rudiment*
  - *Processus articulares superiores*
  - *Processus articulares inferiores*
  - *Processus spinosus*

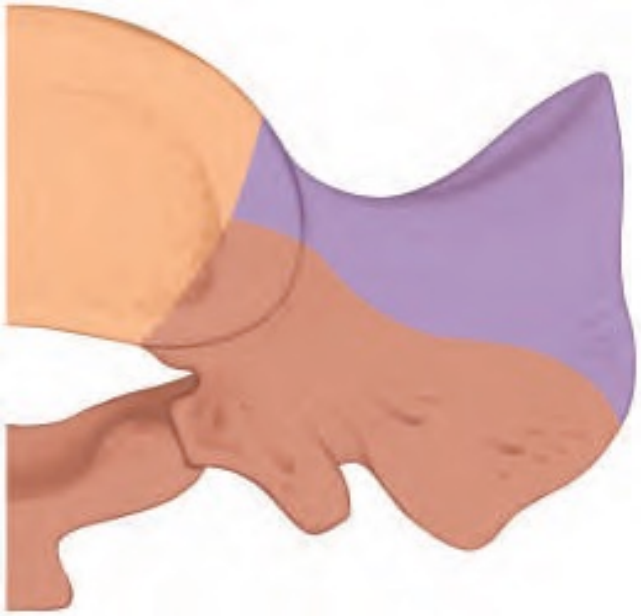




General shape

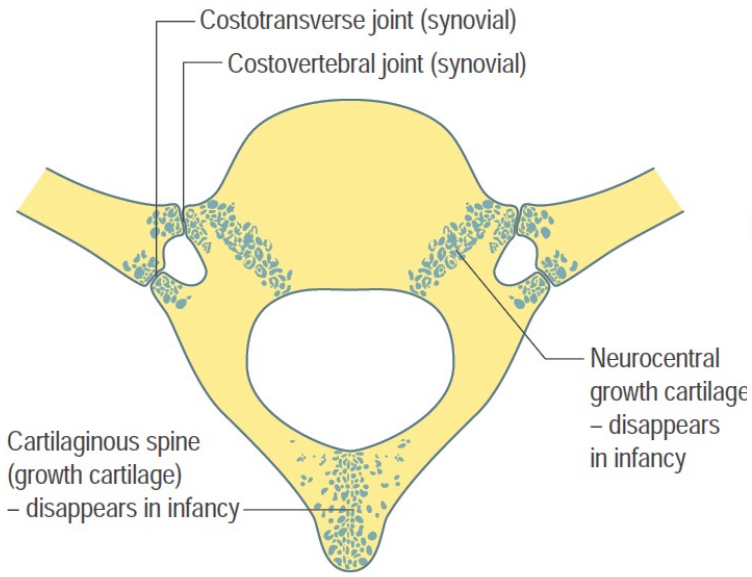


- Corpus vertebrae
- Arcus vertebrae
- Pars costalis (costa)

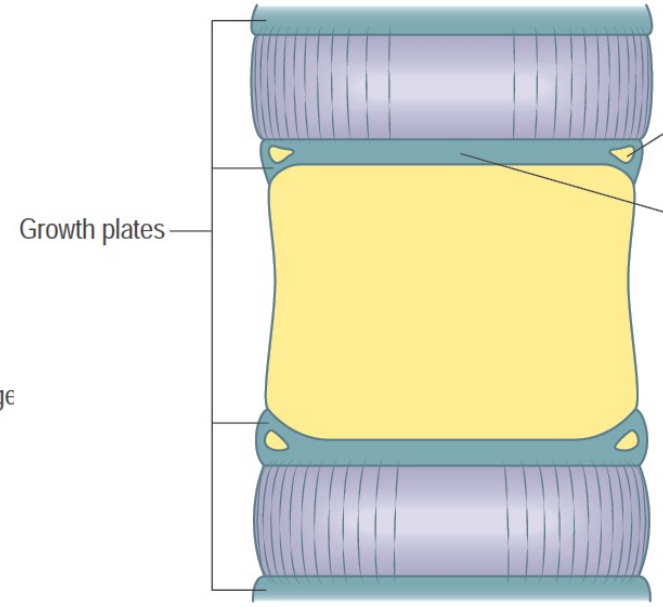


Ossification

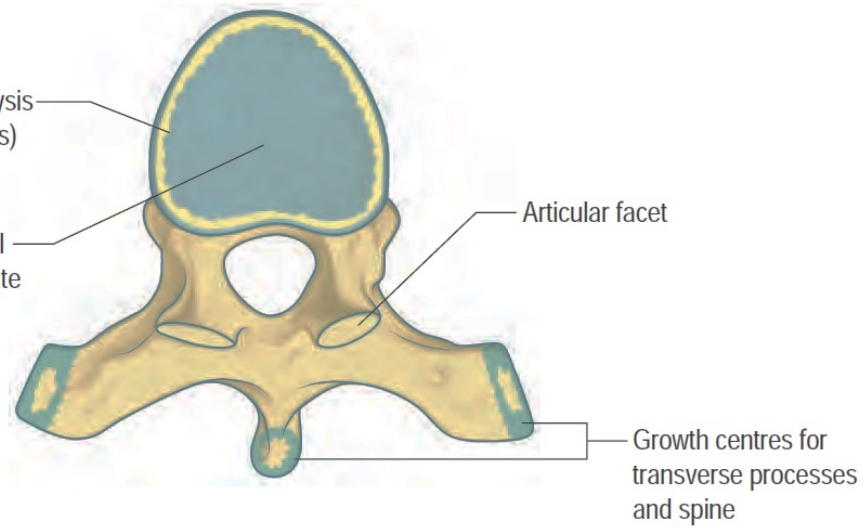
- Corpus vertebrale – neurocentral cartilage, epiphysis circularis
- Arcus vertebrae
- Processus vertebrales - cart. proc. transversus, spinosus, articularis



Bony vertebra with cartilaginous growth region

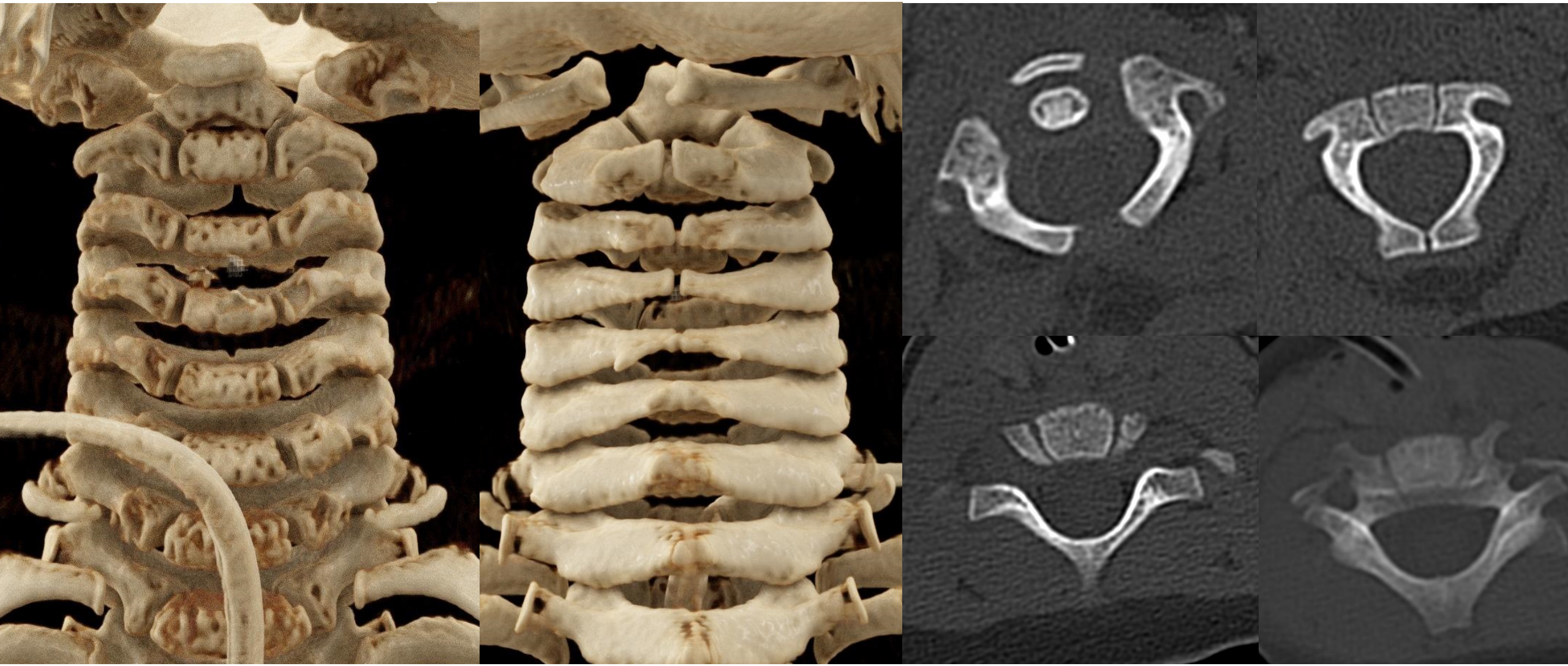


2 – Adolescence



3 – Adolescence

Ossification

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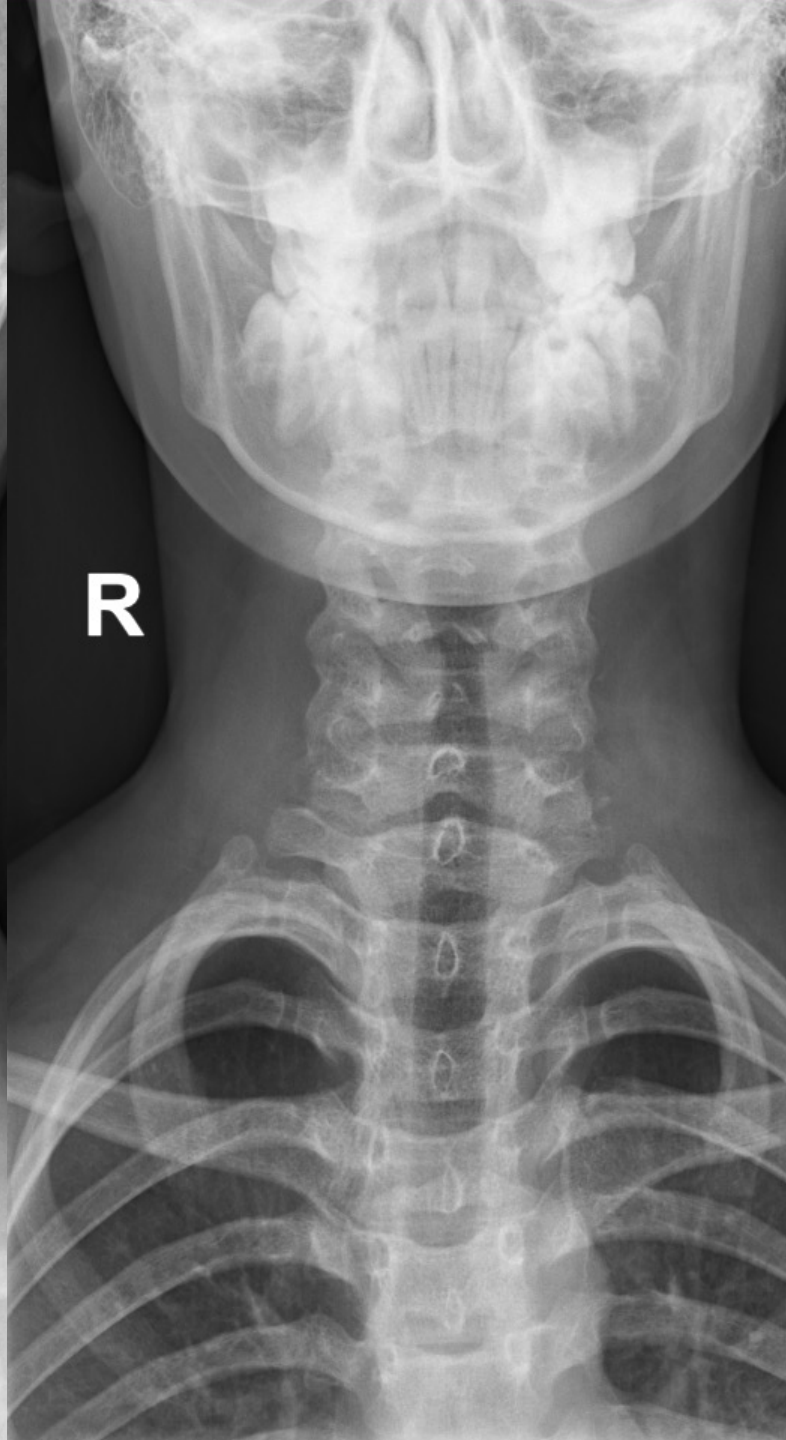
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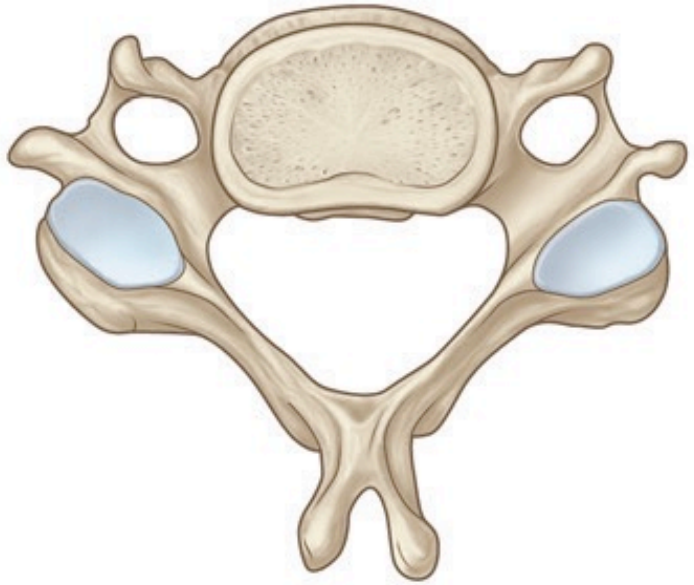
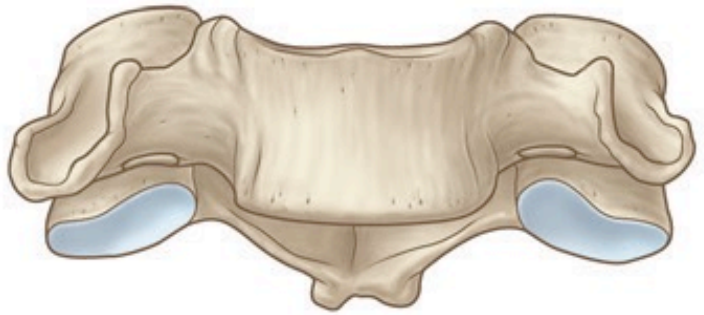
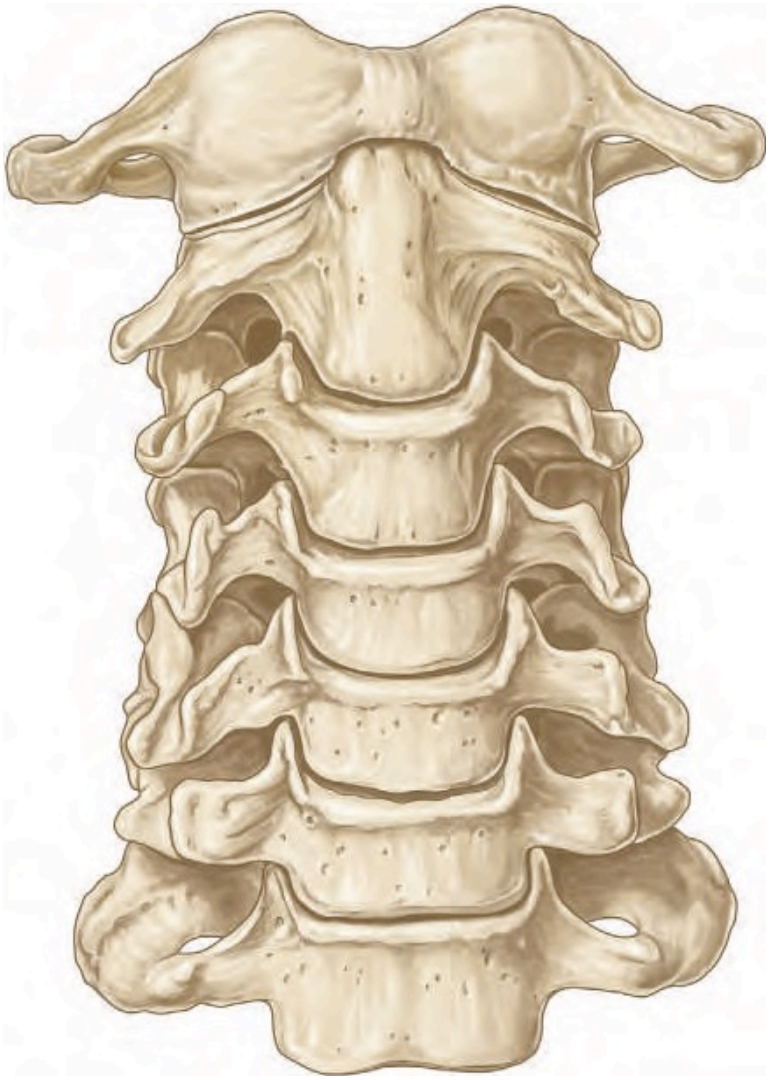
Vertebrae cervicales

- **C1- atlas**
- **C2 - axis**

- Foramen vertebrale- triangle
- Foramen transversarium
- Fused with rib rudiment
- Processus spinosus bifidus
- Processus uncinatus - uncus
  - Art. uncovertebralis

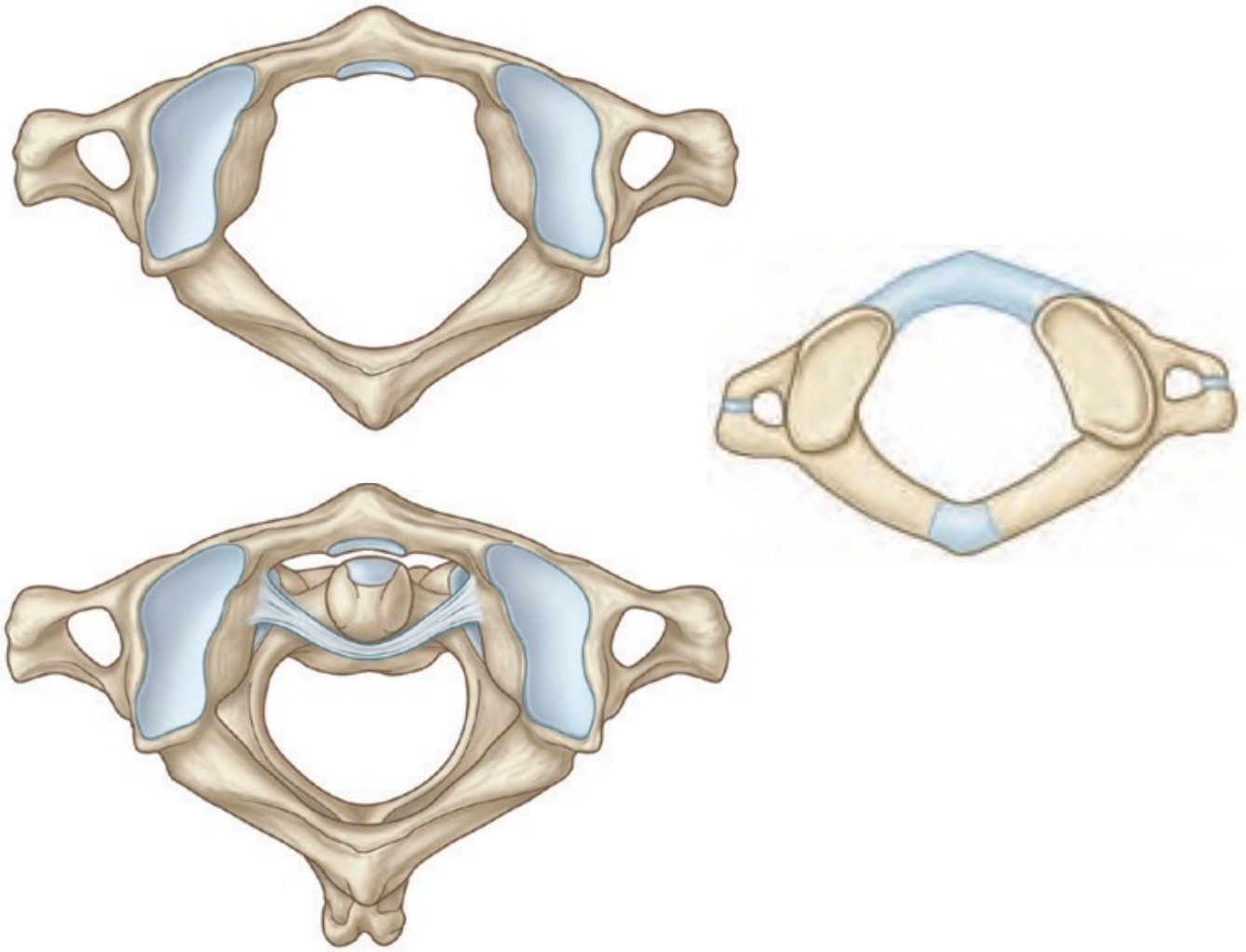






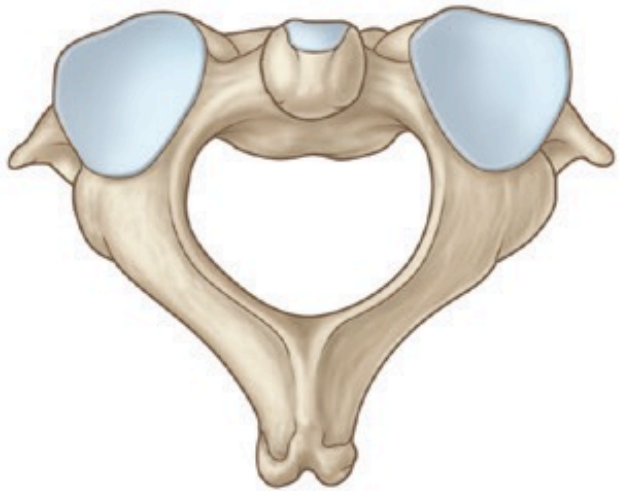
Atlas

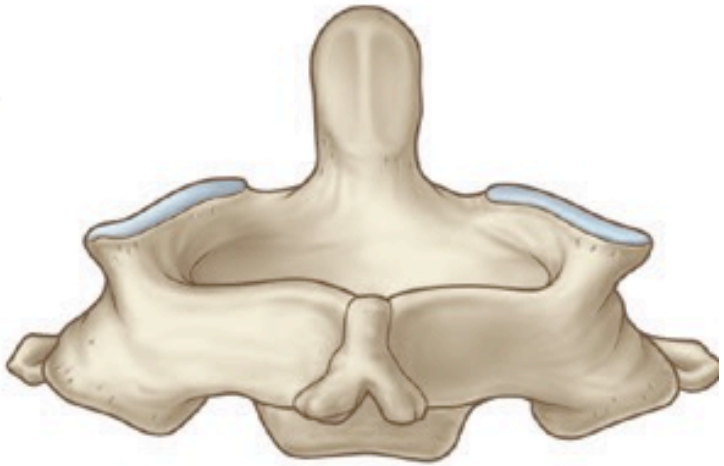
- C1 - atlas
  - Arcus anterior
    - Tuberculum anterius
    - Impresiones ligamenti alaris
    - Faceta dentis
  - Massa lateralis
    - Facet of atlantooccipital joint
    - Processus transversalis
    - Foramen transversarium
  - Arcus posterior
    - Tuberculum posterius

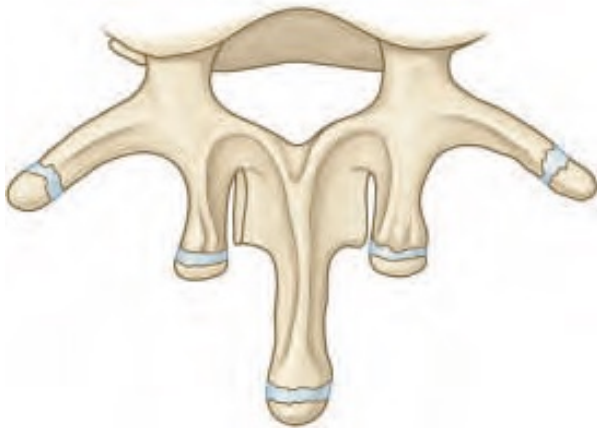


Axis

- **Dens axis**
  - **Faceta**
  - **Facetae ligg. alarium**
- **Corpus**
- **Facies articularis sperior, inferior**
- **Arcus**
- *Lever for muscles moving with a he*

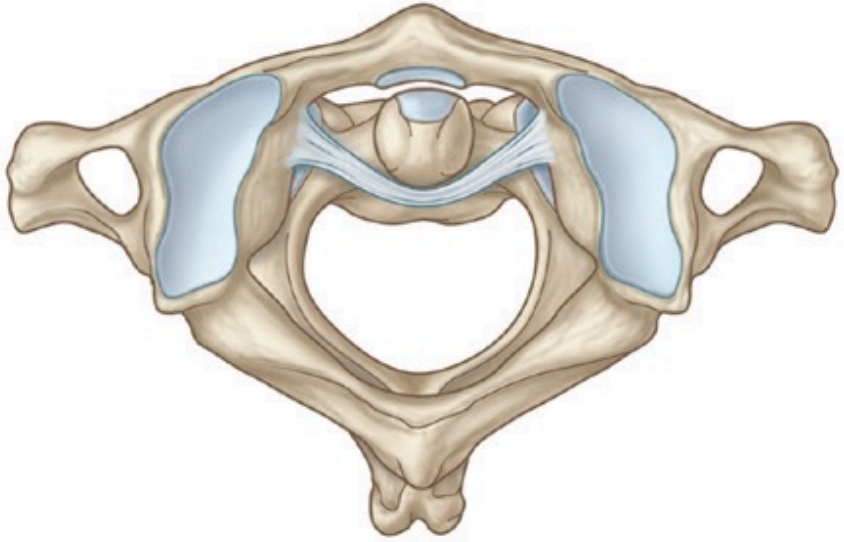


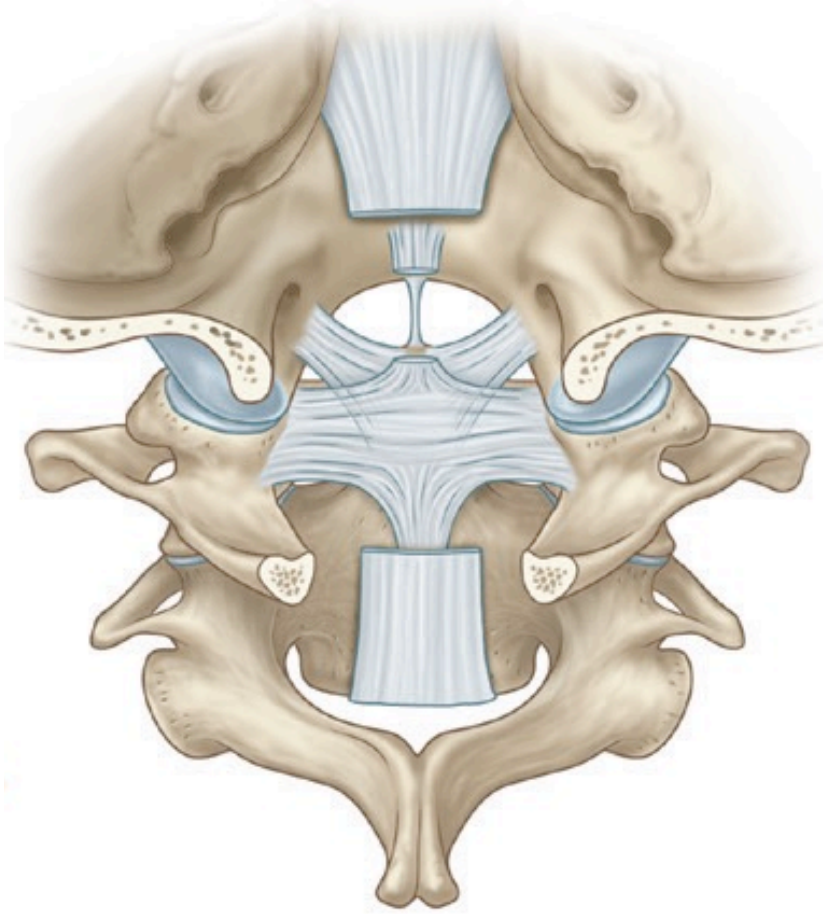


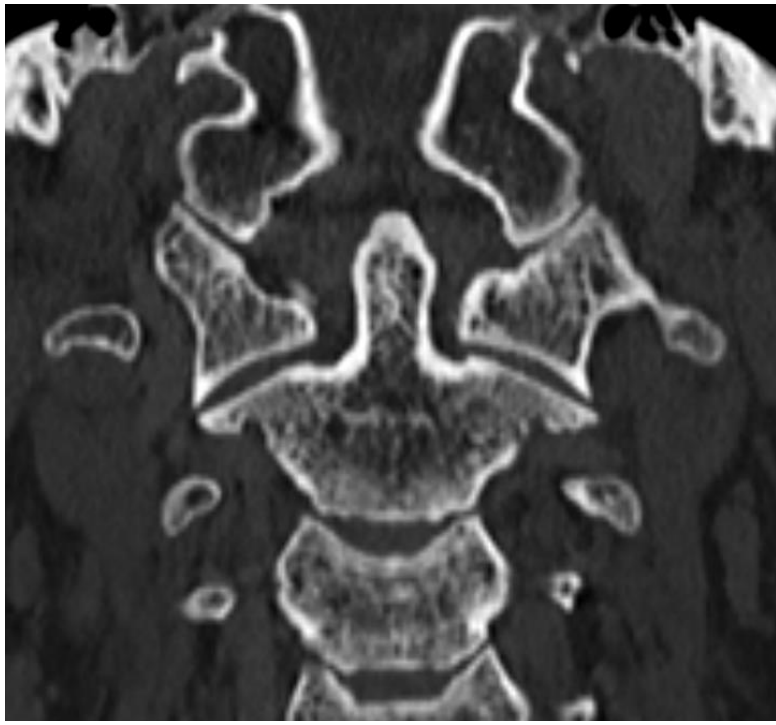


Connection of head and spine

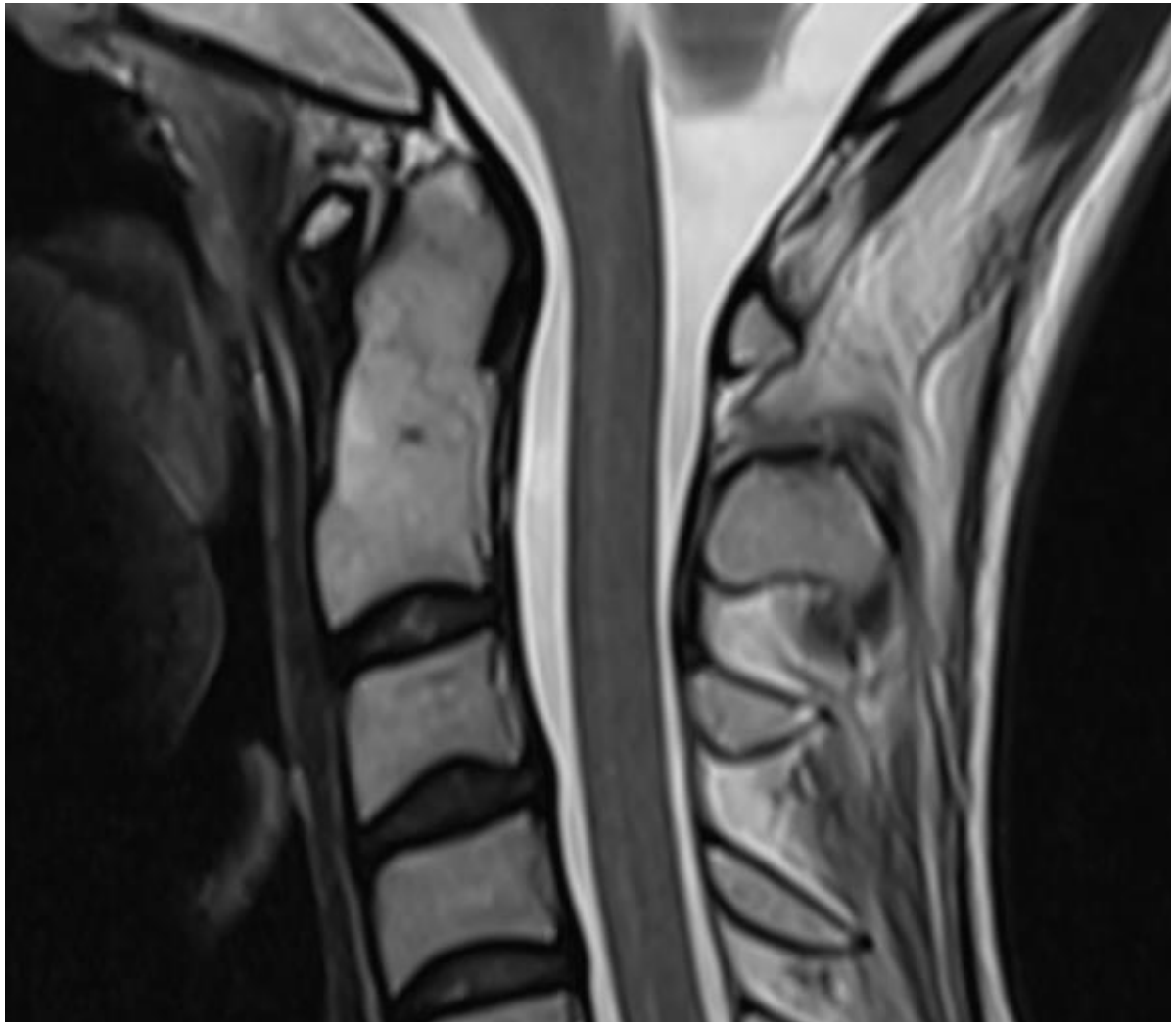
- Articulatio atlantooccipitalis
- Articulatio atlantoaxialis
  - Ligamentum transversum
  - Ligg. alaria
  - Lig. cruciatum
  - Lig. longitudinale posterius
  - Lig. apicis dentis

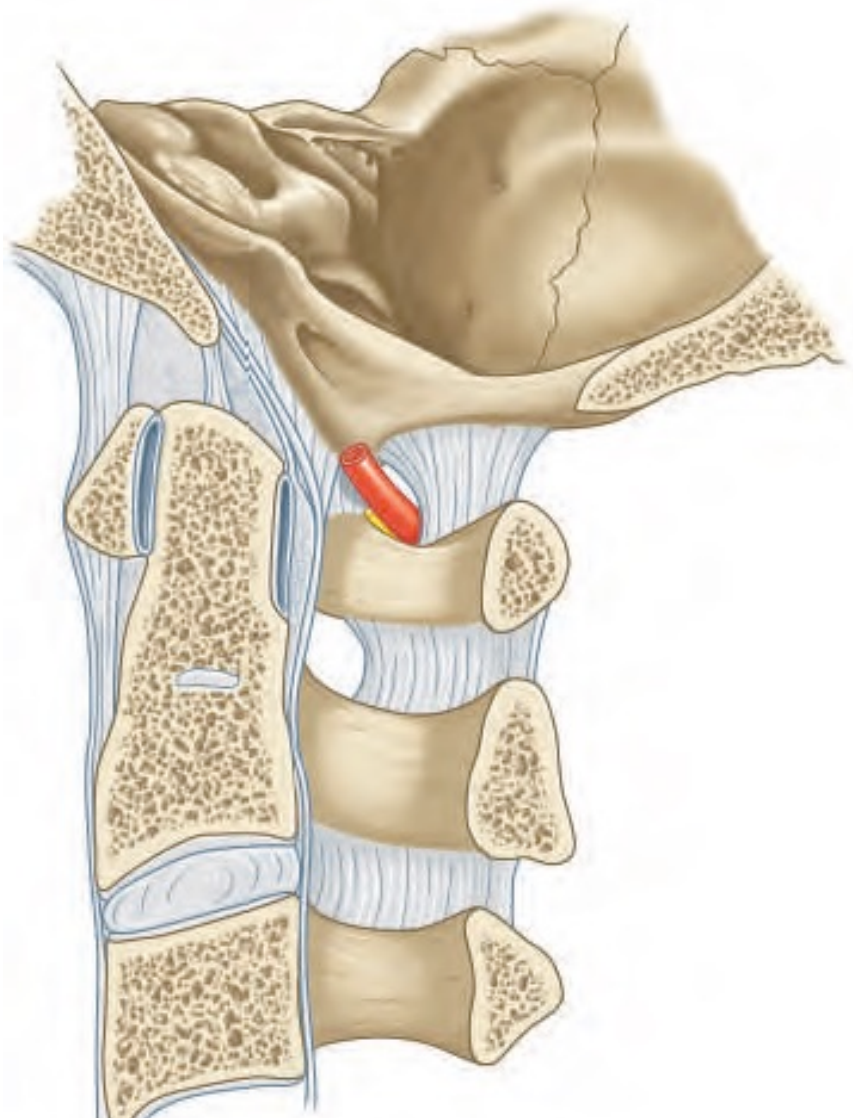


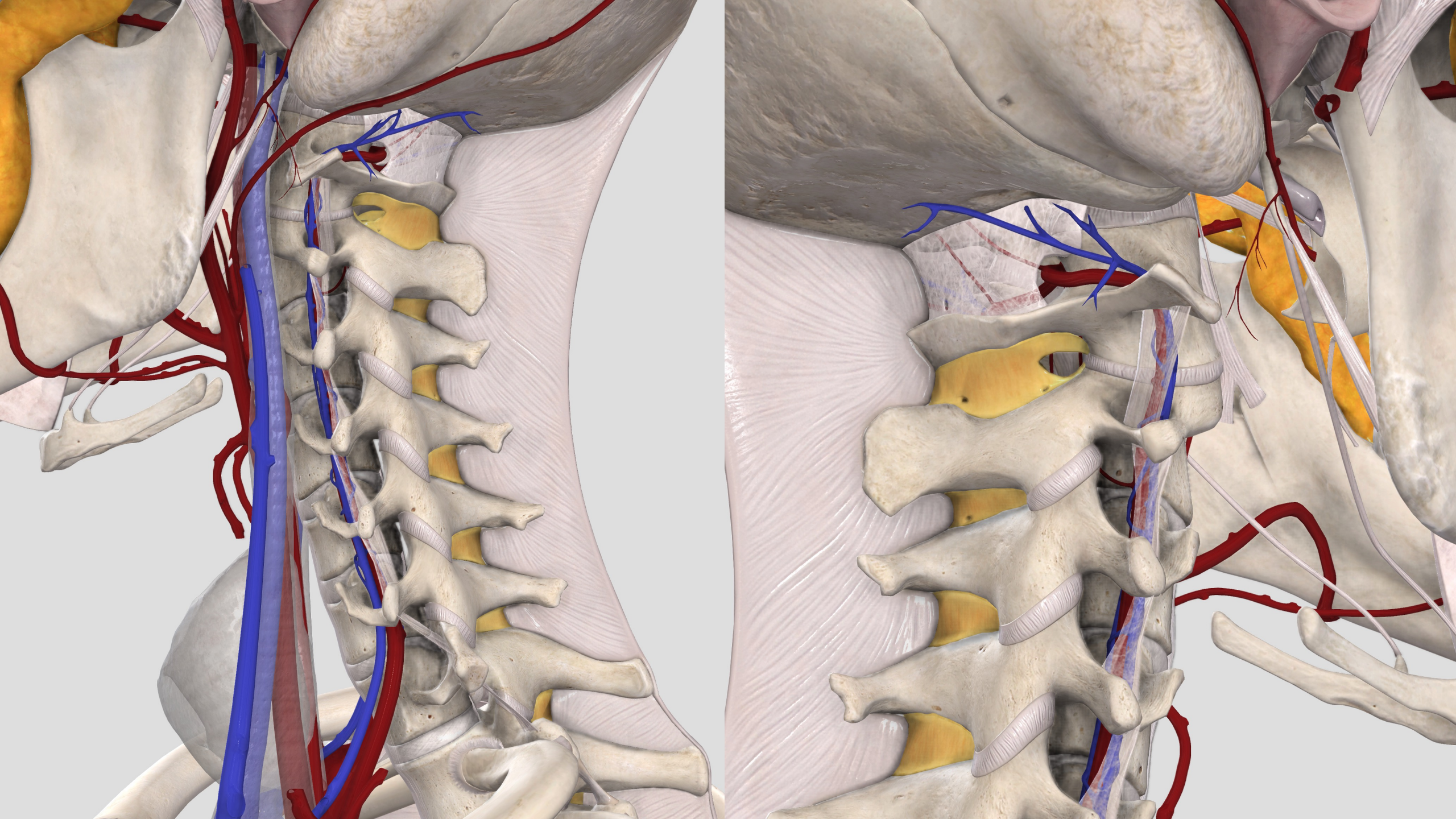




Connection of head and spine



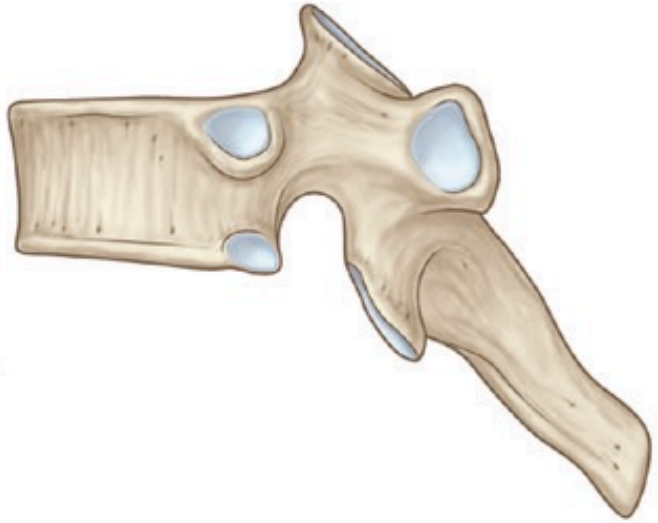


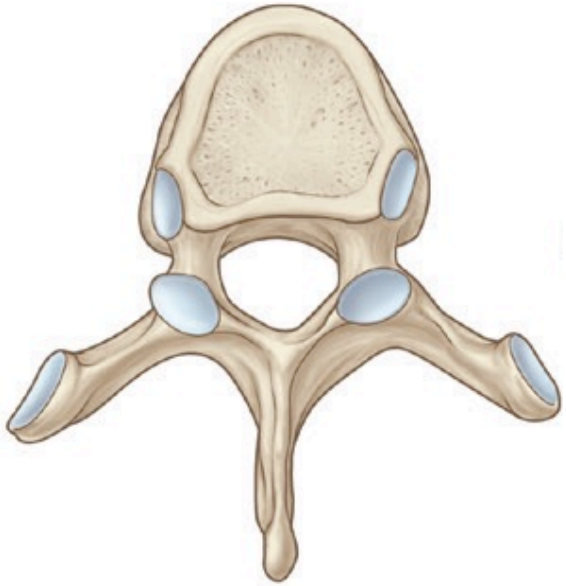


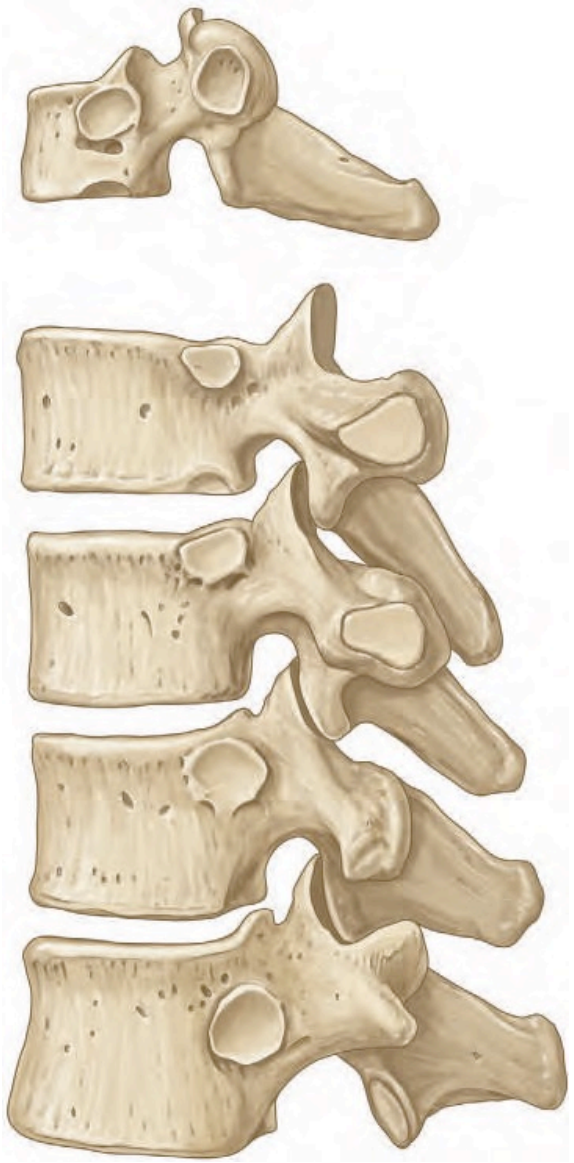
Dental fracture

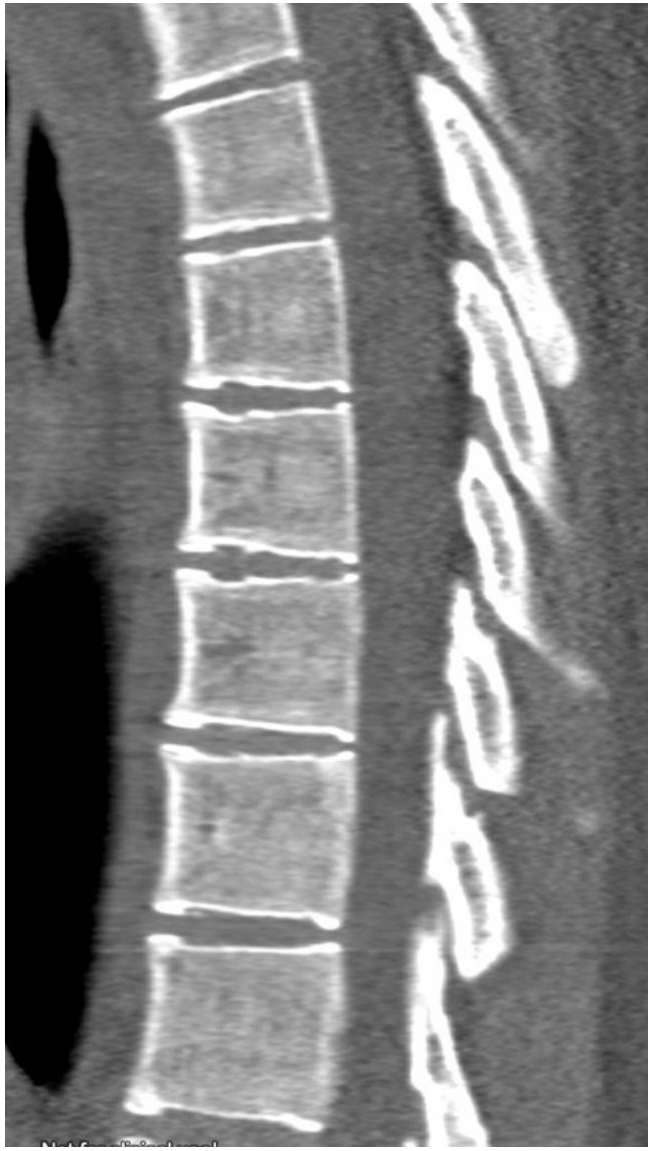
Vertebrae thoracicae

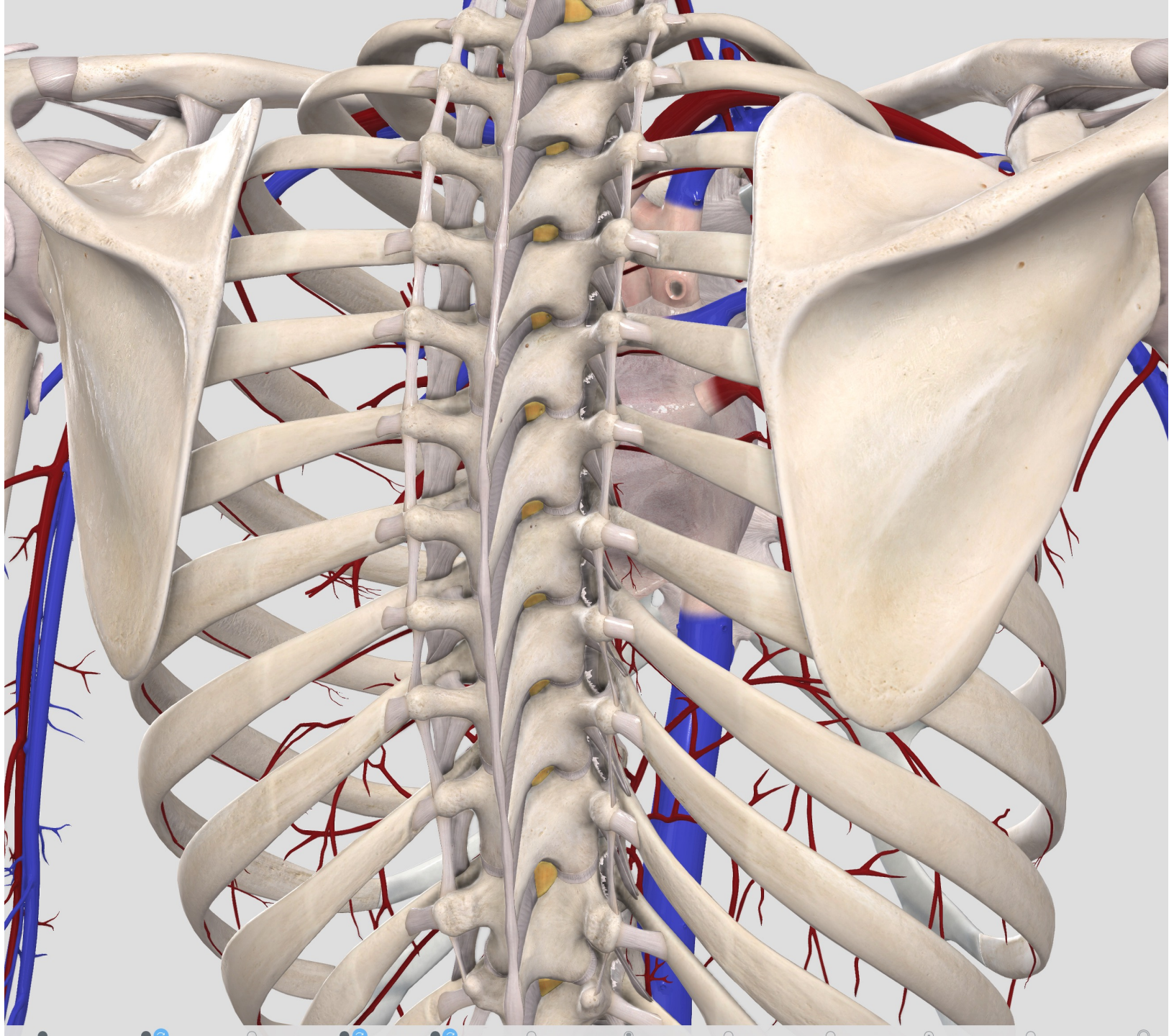
- Thoracic vertebra
  - rib
  - socket
    - Demifaccette upper
    - Demifacette lower
  - Art. costotransversalis
    - S tubeculum costae





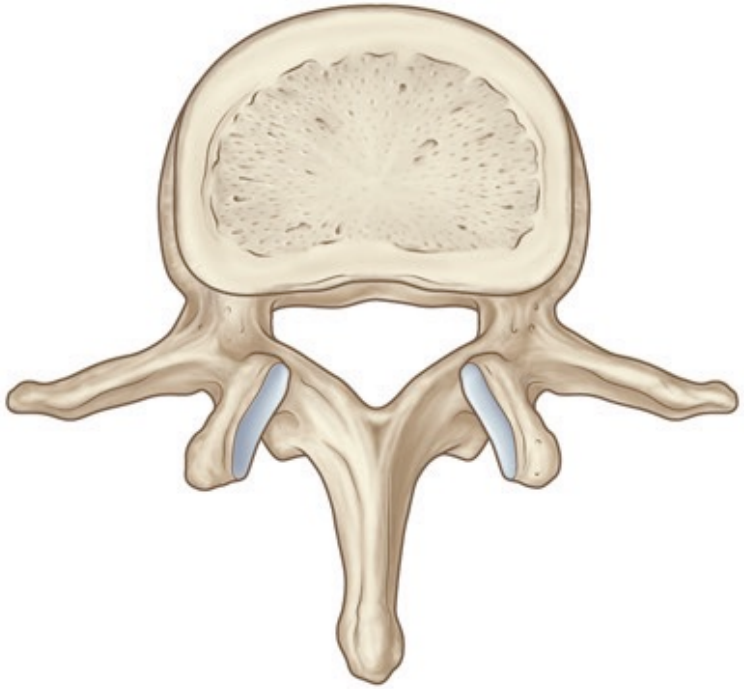


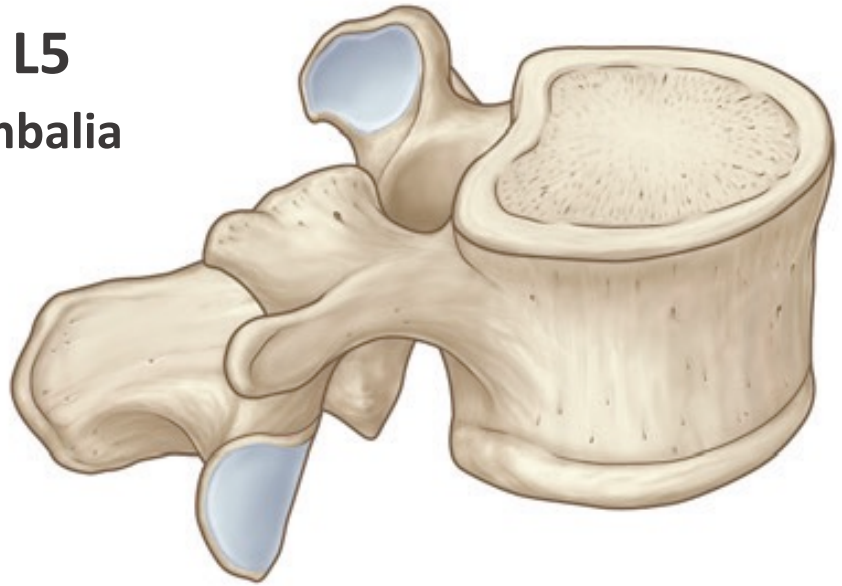




Vertebrae lumbales

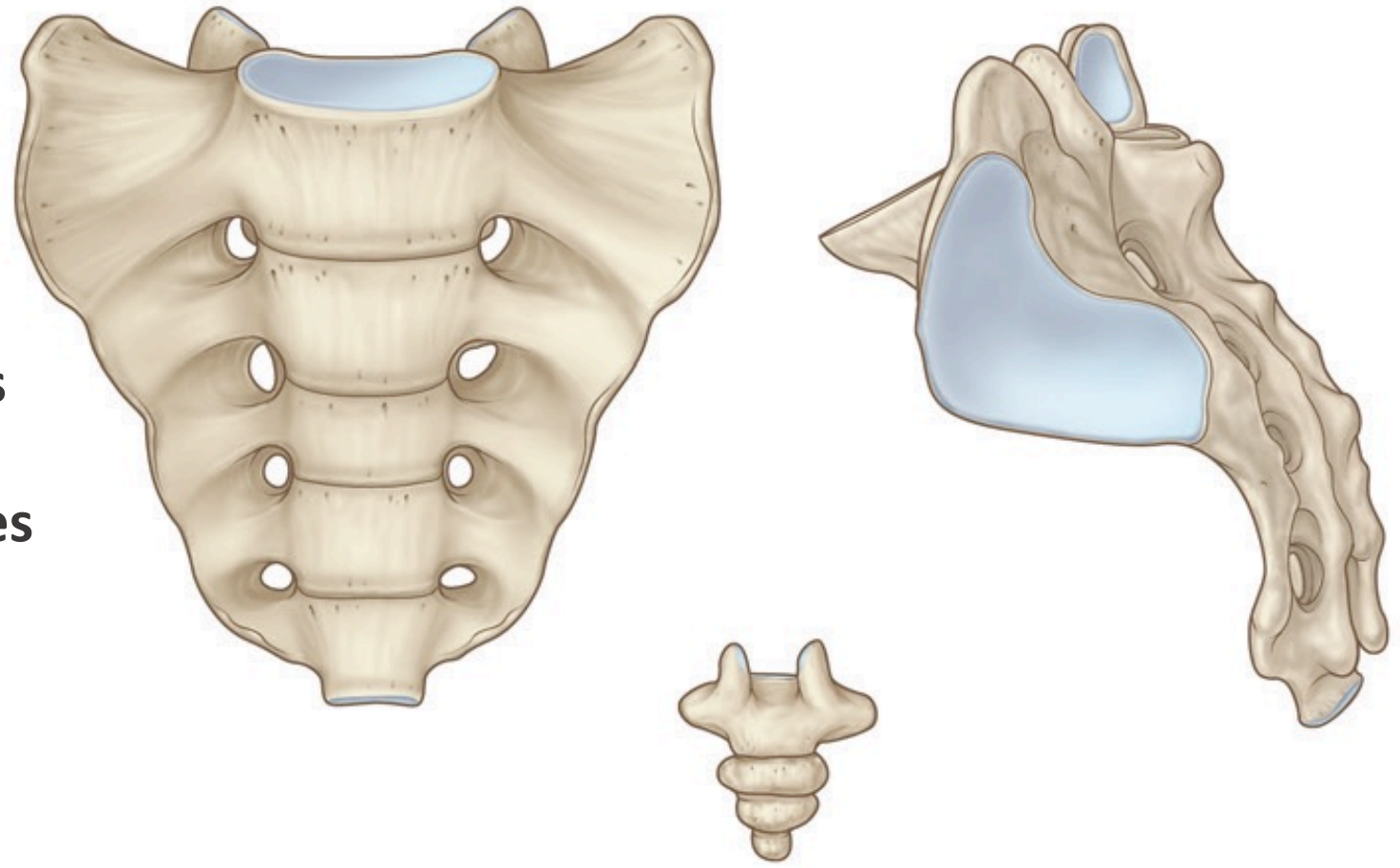
- Large body
- triangula foramen vertebrale
- Fusion of the rib rudiment
- Processus mammilaris (na proc. articularis)
- Curved articular surfaces
- Proc. transversus L5
  - Úpon ligg iliolumbalia





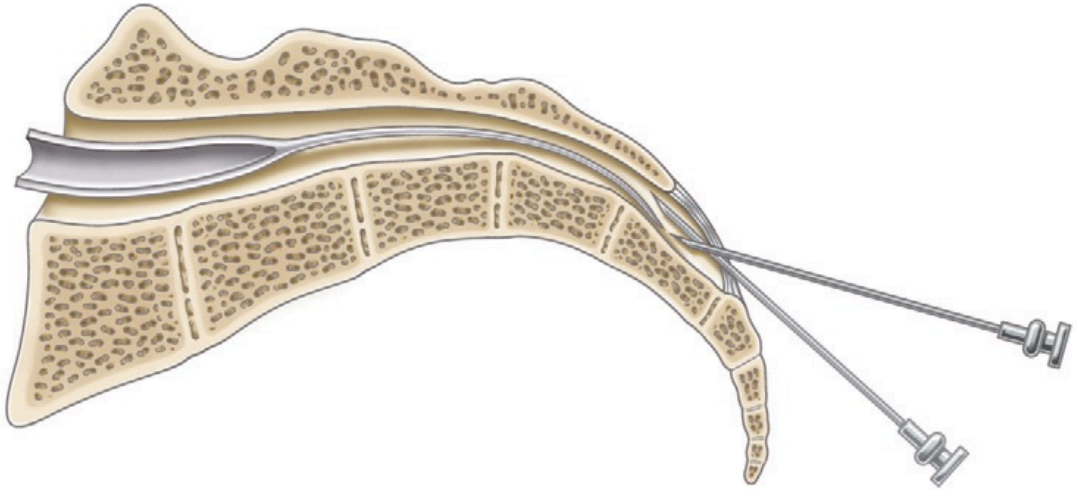
Os sacrum a os coccygeum

- **Os sacrum**
  - Synostoses of five segments
  - Corpus
  - Massa lateralis
  - Apex
  - Hiathus sacralis
  - Foramina sacralia anteriores
    - 4 paires
  - Foramina sacralia posteriores
    - 4 paires
  - Facies articularis sacroiliaca
- **Os coccygeum, coccyx, tailbone**
  - Cornua coccygea



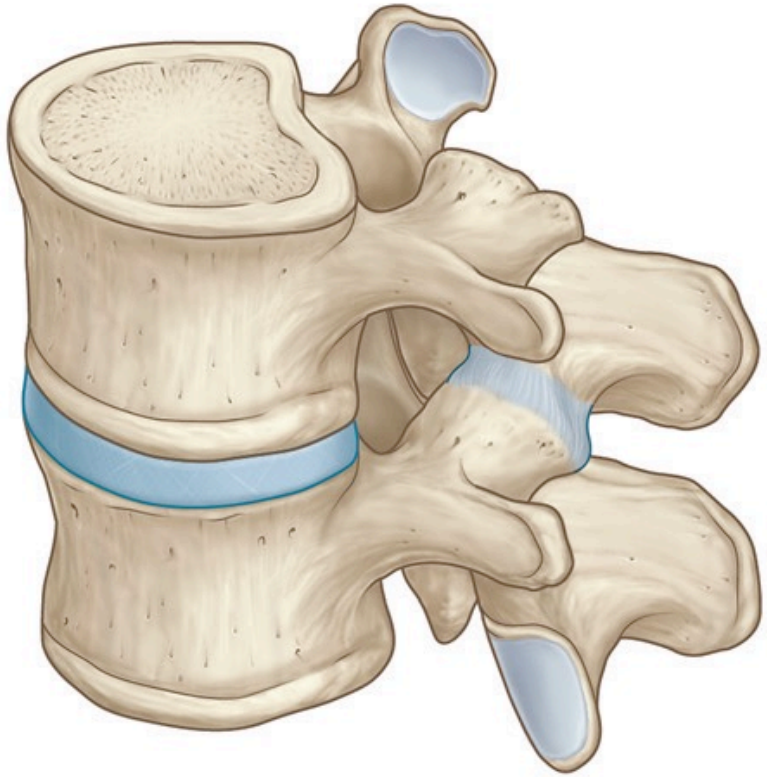
Canalis sacralis

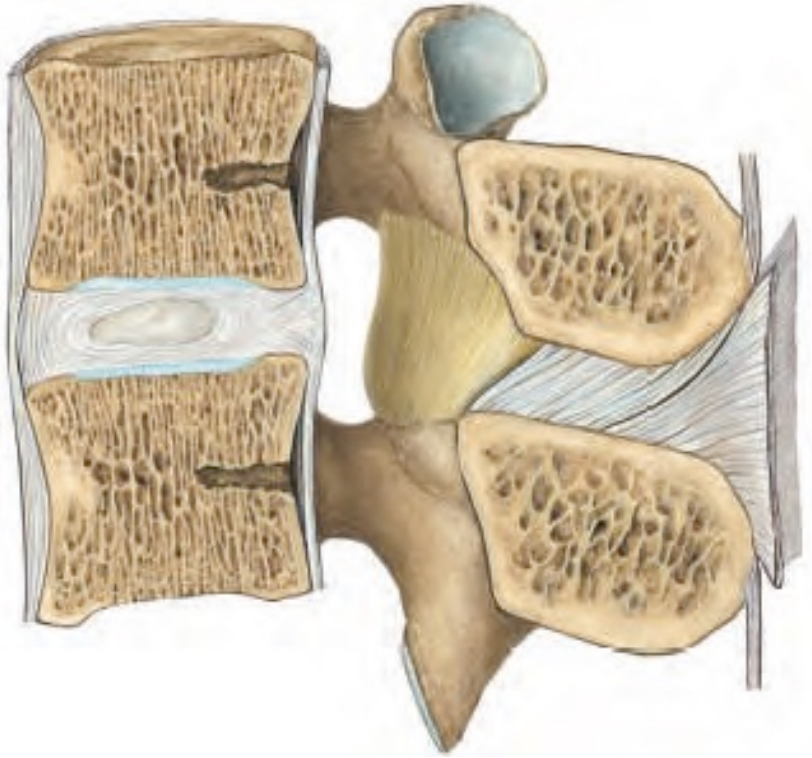
- Epidura anaesthesia
  - Punction in hiathus sacralis



Inververtebral connections

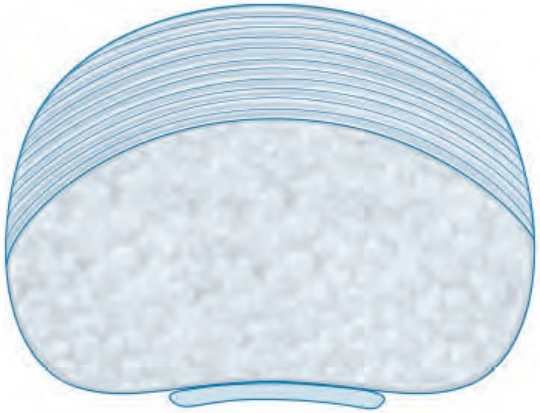
- **Symphysis intervertebralis**
  - Discus intervertebralis
  - Anulus fibrosus
  - Nucleus pulposus
- **Articulation intervertebralis**
  - Zygapohysialis
- **Articulatio uncovertebralis**
- **Ligamenta**

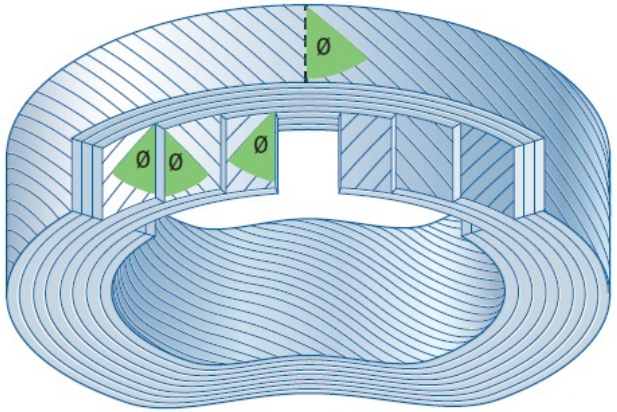


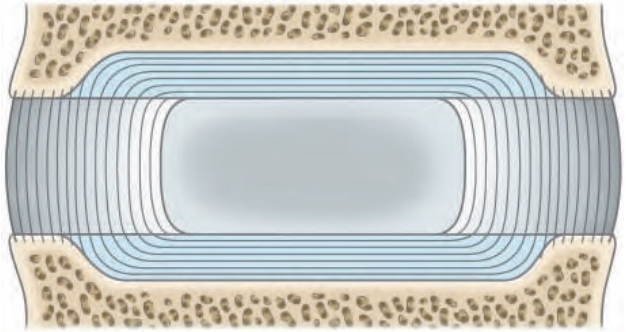


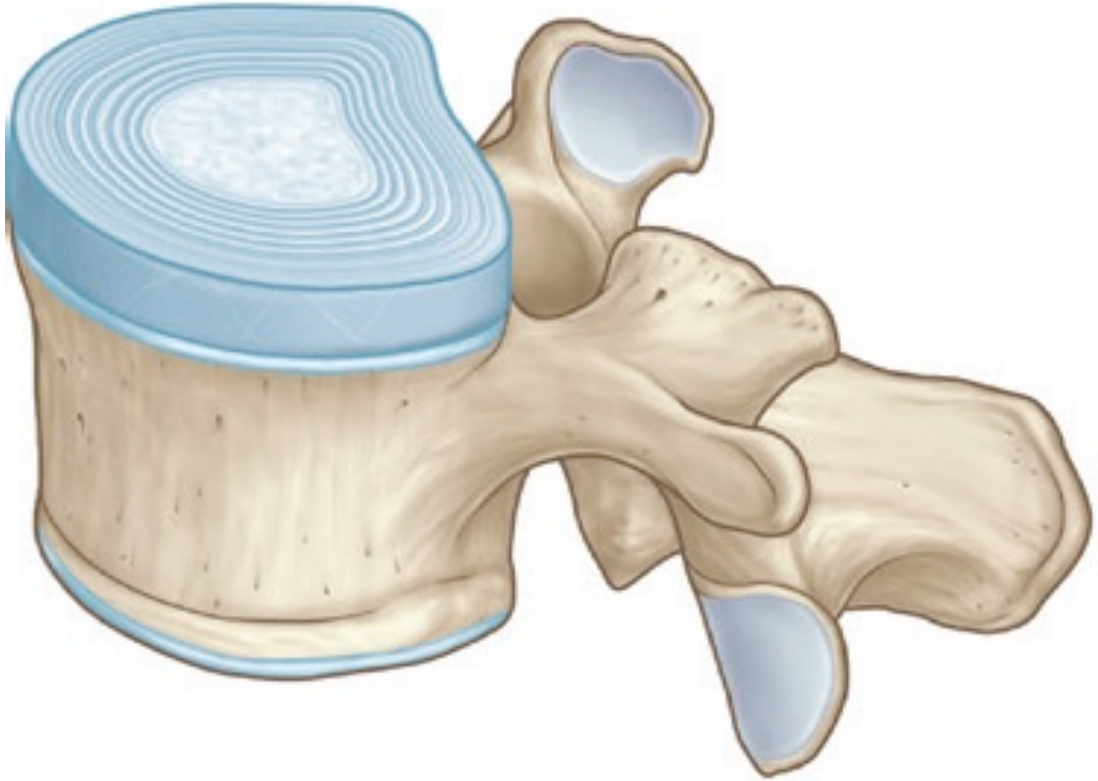
Discus intervertebralis

- Anulus fibrosus – fibrous cartilage
- Nucleus pulposus – gelatinous centre

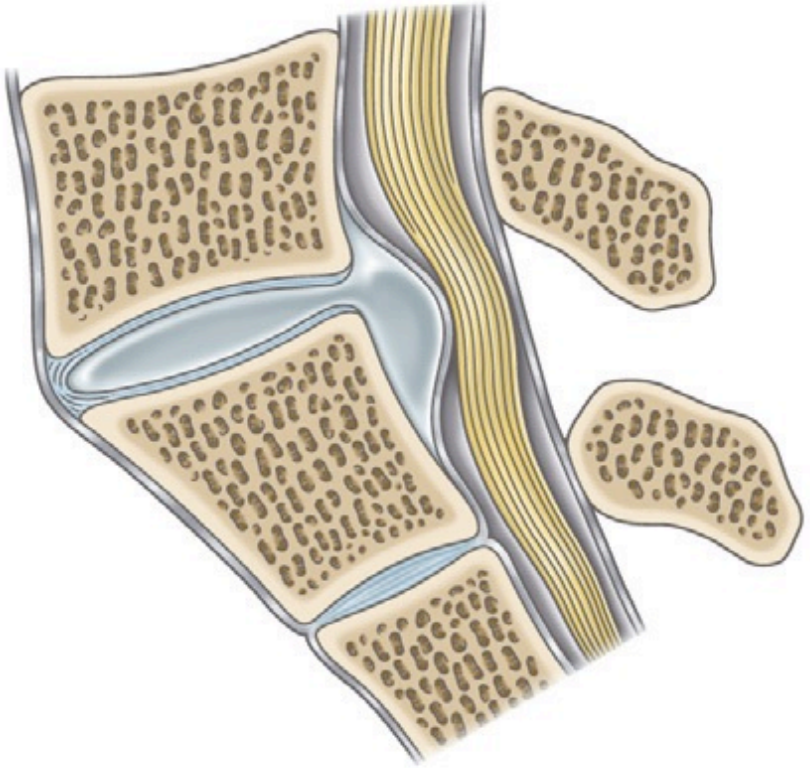


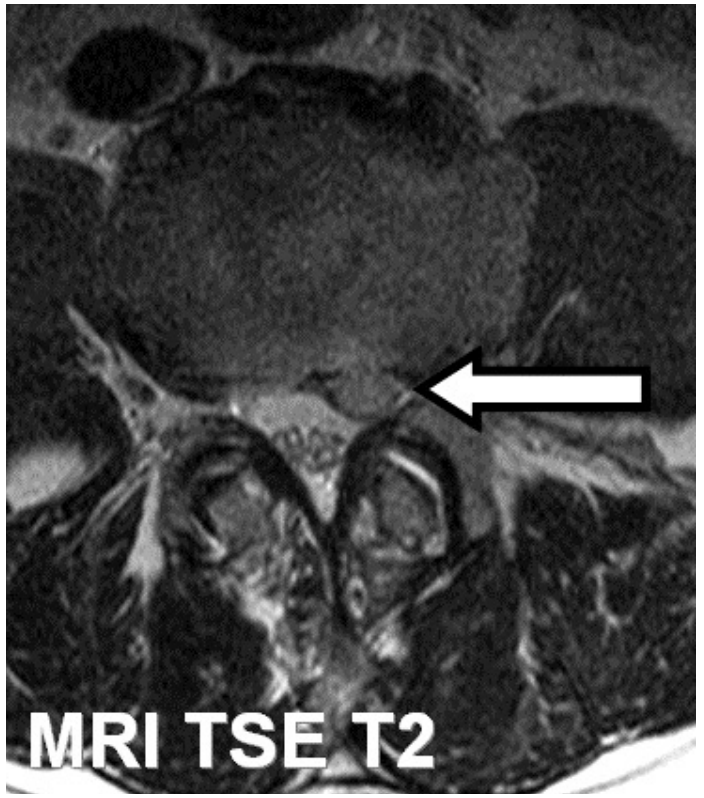


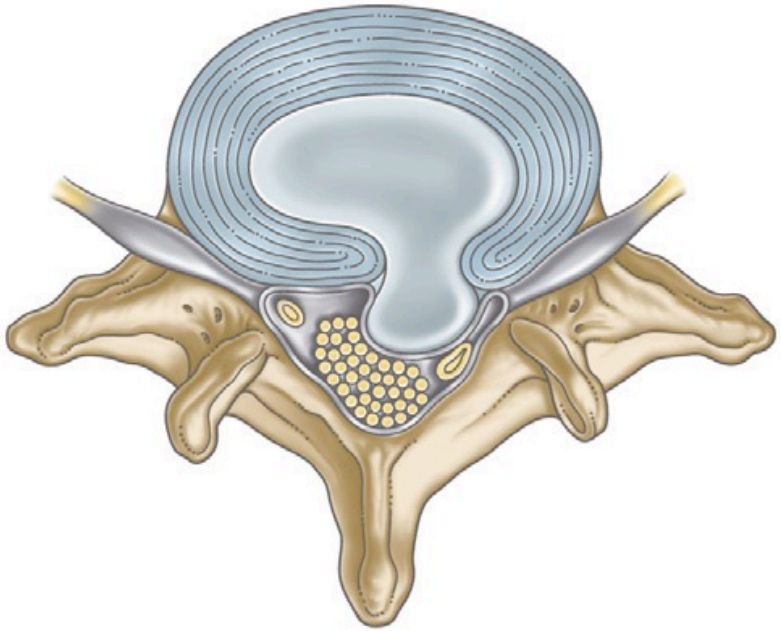




Discus intervertebralis



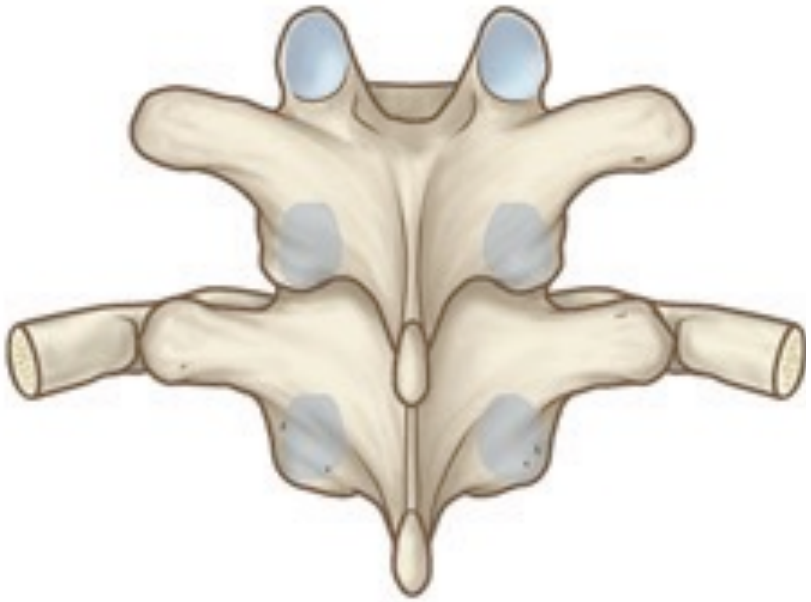


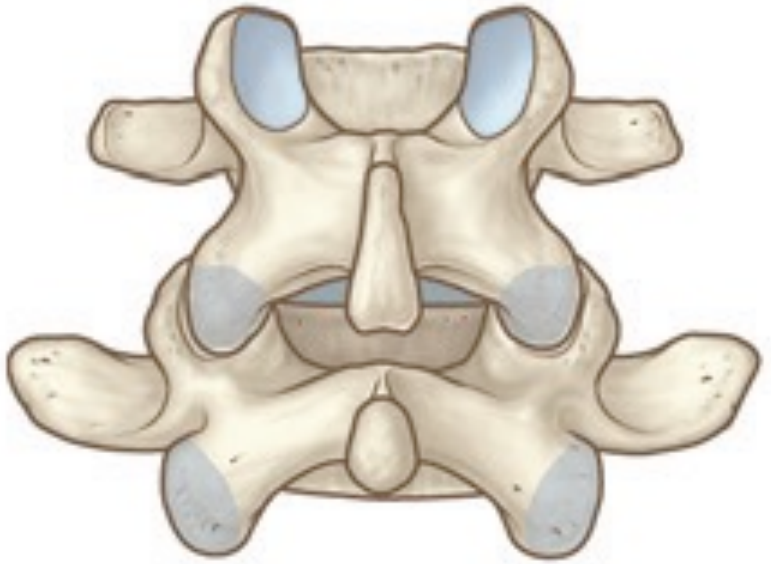


Dorsal intervertebral space

- **Cervical and lumbar**
- *Overlapping arches*
- *Compaque bony shield*

- **Lumbar space**
  - **Gaops between laminae**
  - **Unlarging in flexion**
  - **Lig. flava**

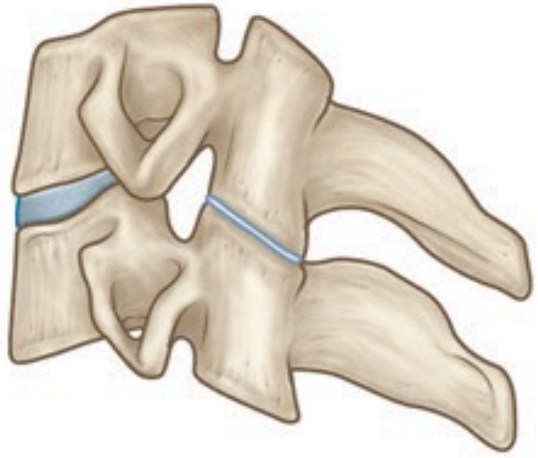


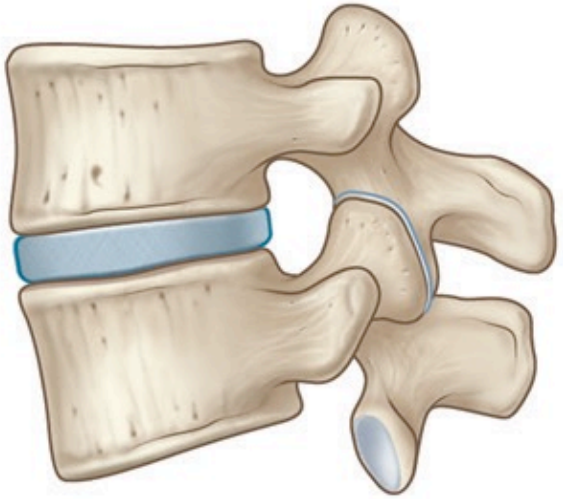


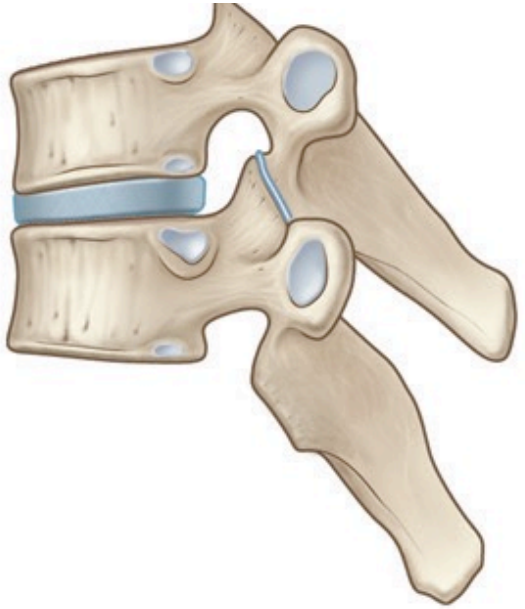
Art. intervertebralis

- **Synovial joints**
- *Between upper and lower facette*

- **Articular facettes**
- **Cervical - oblique**
  - *Facilitation of flexion and extension*
- **Thoracic - vertical**
  - *Limiting flexion and extension*
  - *Facilitation of rotation*
- **Lumbar - curved**
  - *Limiting flefion and extension*

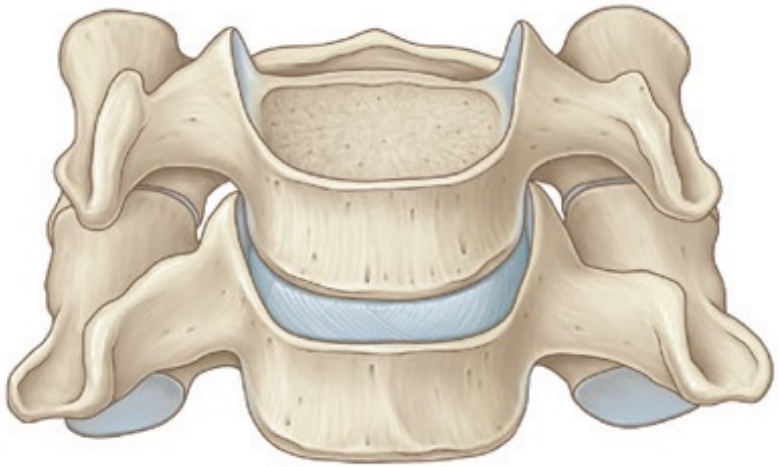


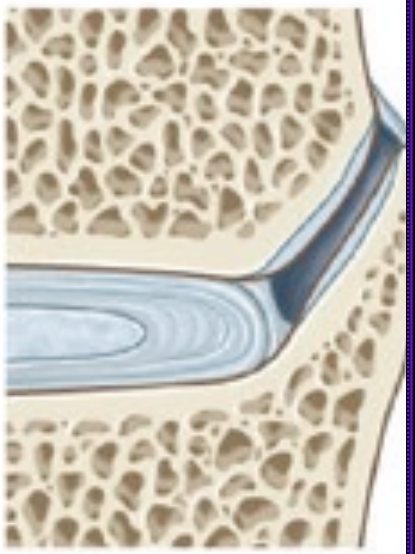




Art. uncovertebralis

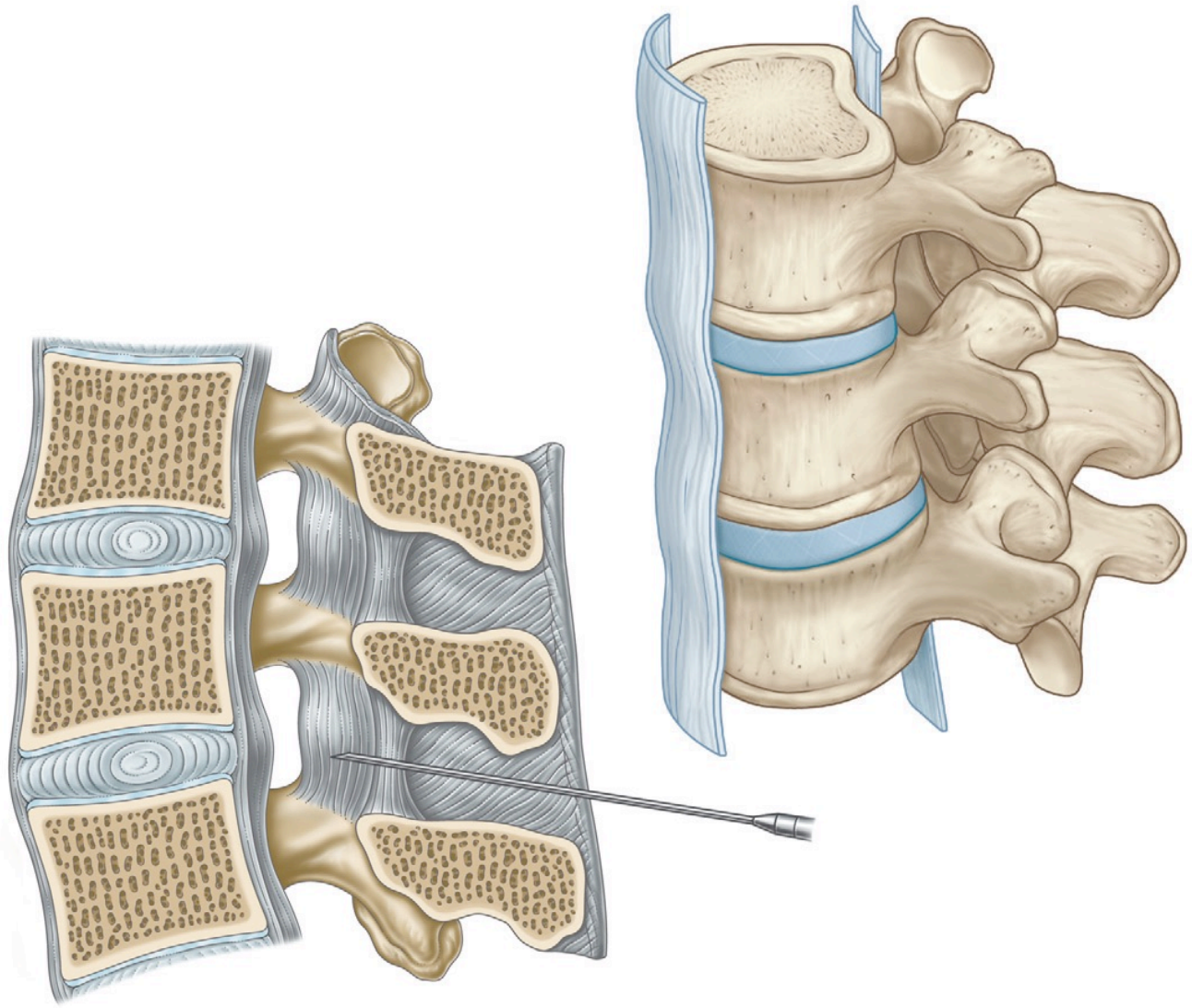
- Synovial
- Prcessus unciformis - uncus
- Facies art. uncovertebralis

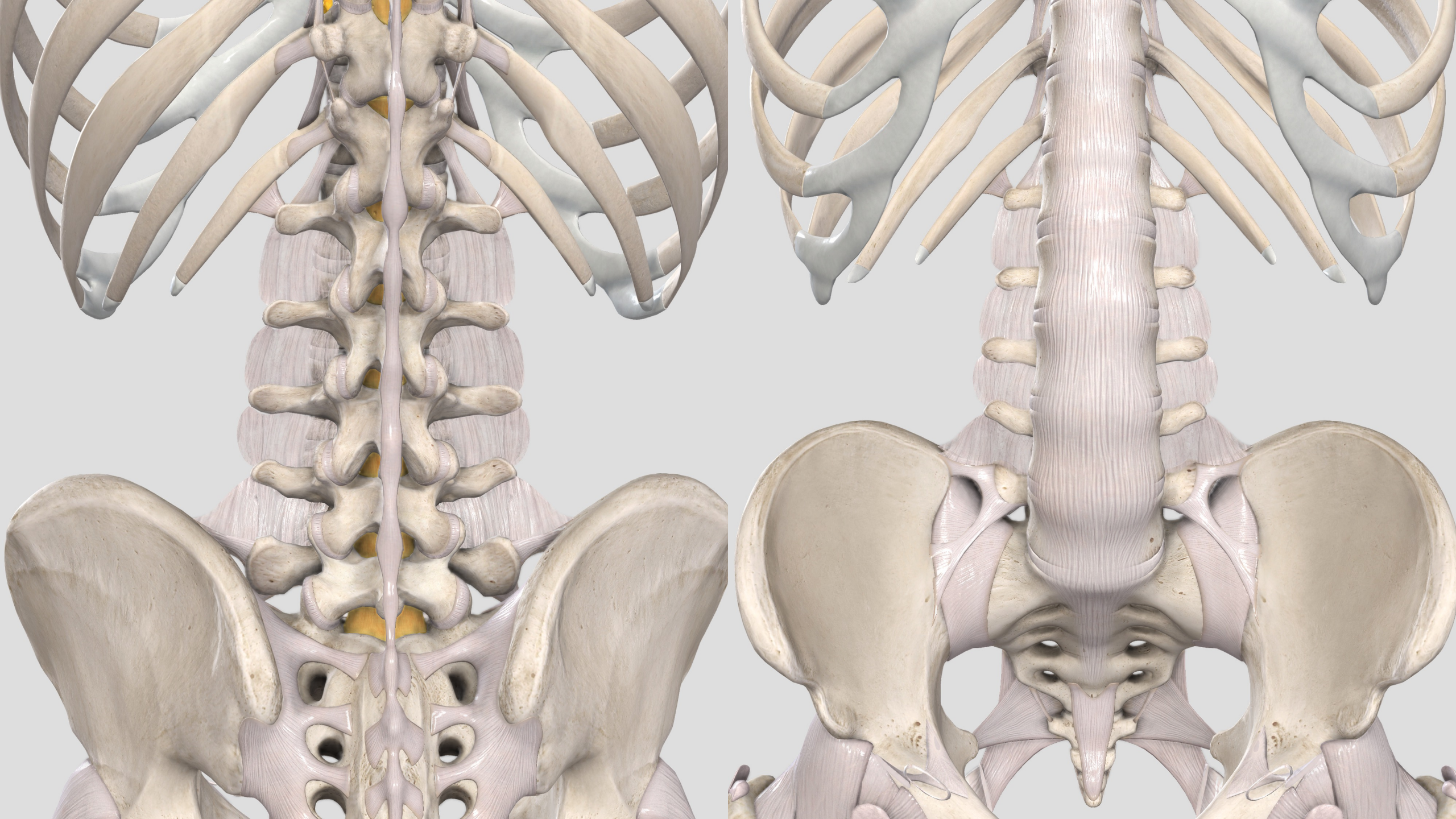




Ligamenta

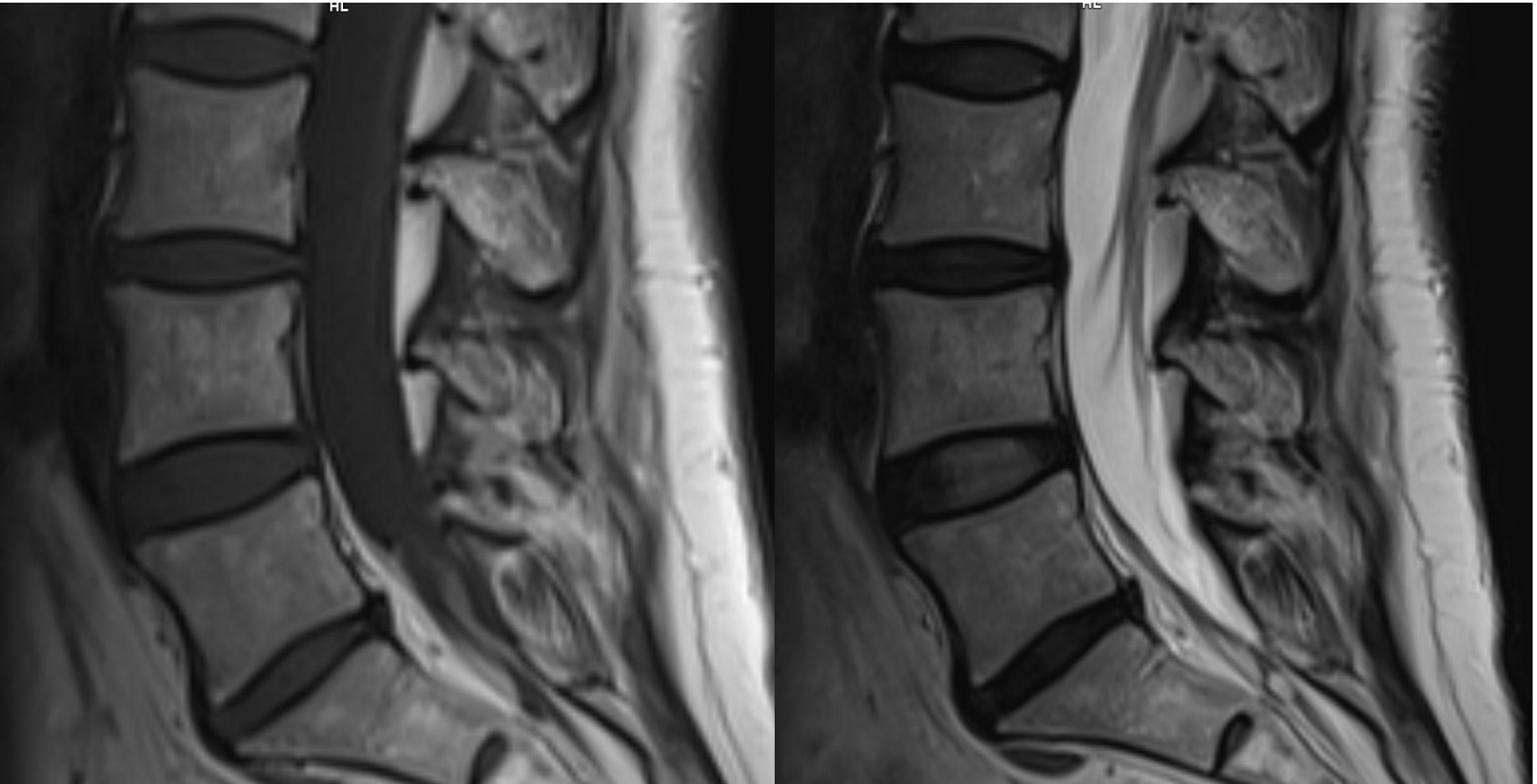
- **Ligamentum longitudinale anterius**
- **Ligamentum longitudinale posterius**
- **Ligamenta flava**
  - *Thin and broad ligaments*
  - *Elastic*
  - *Rexoil after flexion*
- **Ligamentum supraspinosum**
- **Ligamentum nuchae**
- **Ligamenta interspinosa**





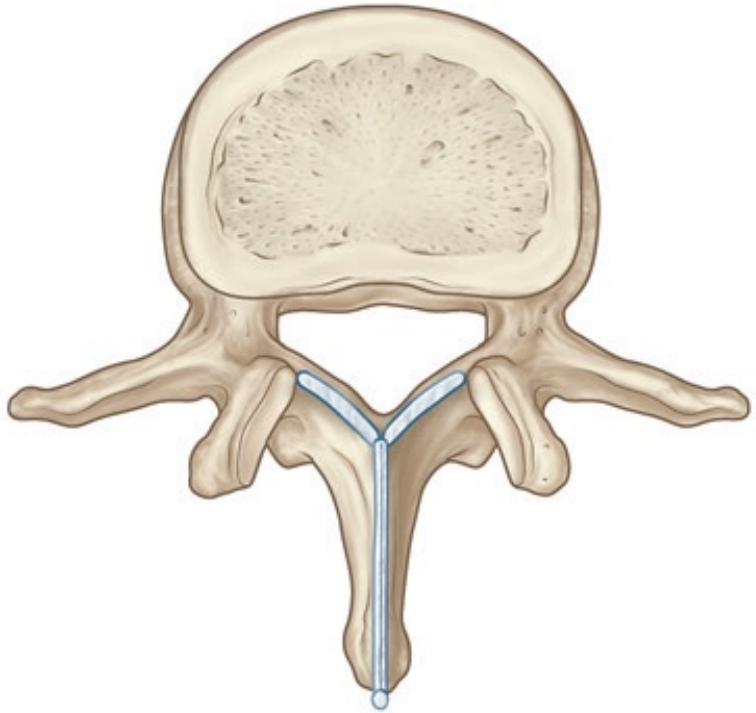
Ligamenta

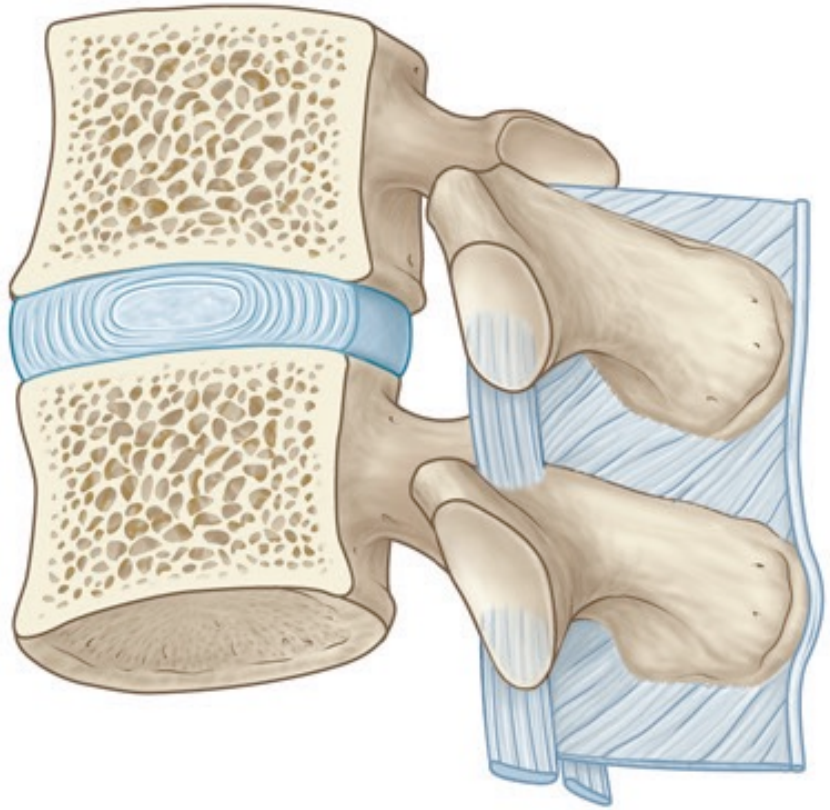
- Frontal - lig. longitudinale anterius, posterius, ligg. flava
- Sagittal - lig. interspinosa, lig supraspinosum, lig. nuchae

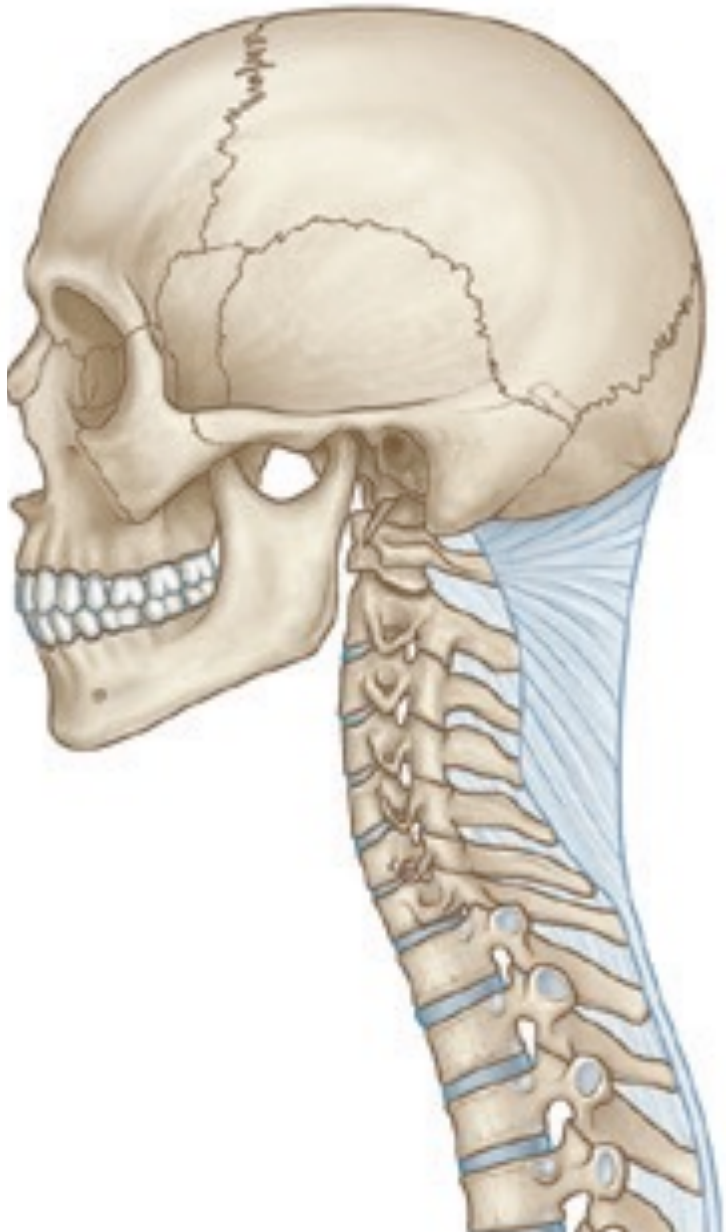


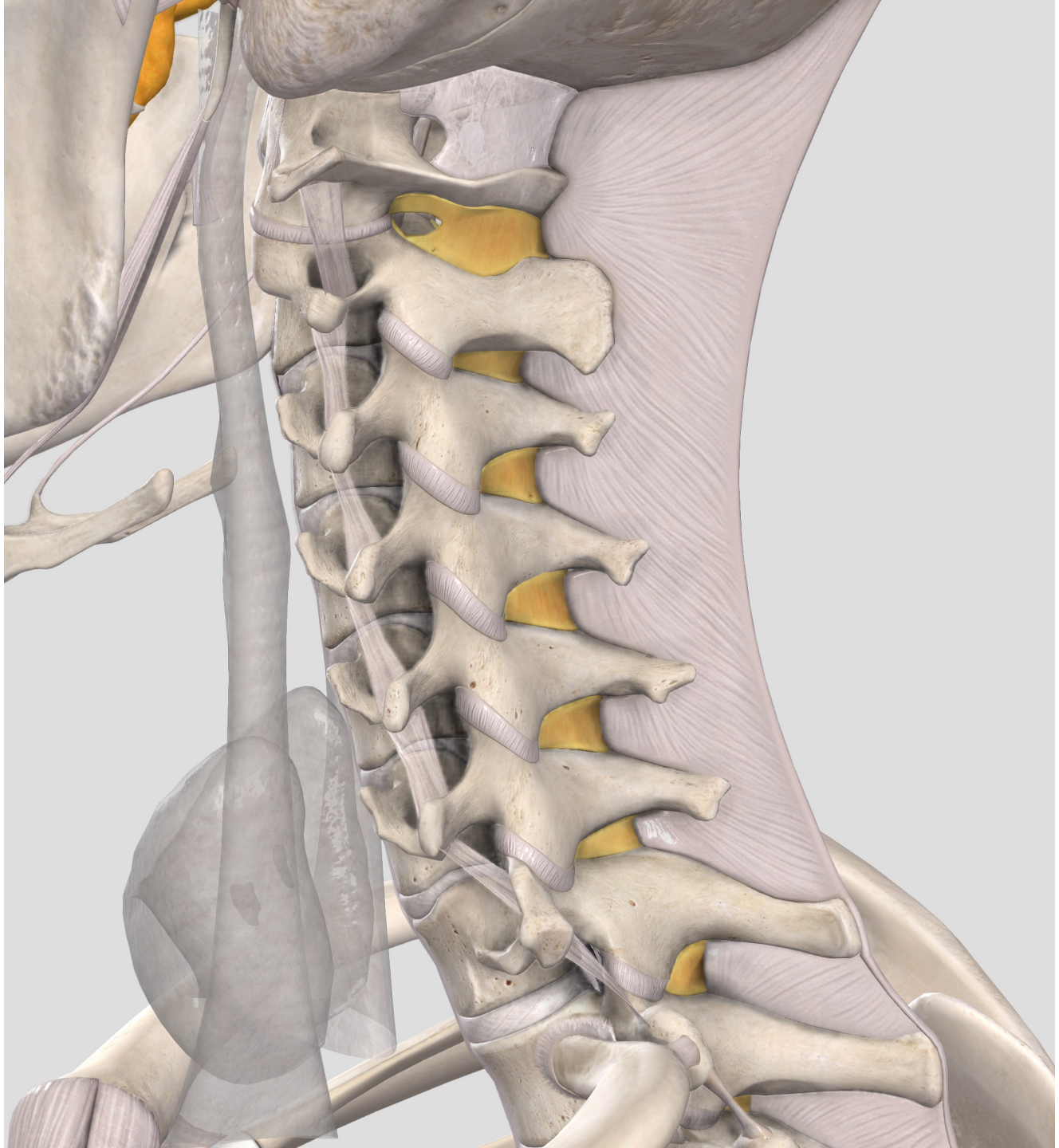
Ligamenta

- Ligamentum supraspinosum
- Ligamenta interspinosa
- Ligamentum nuchae



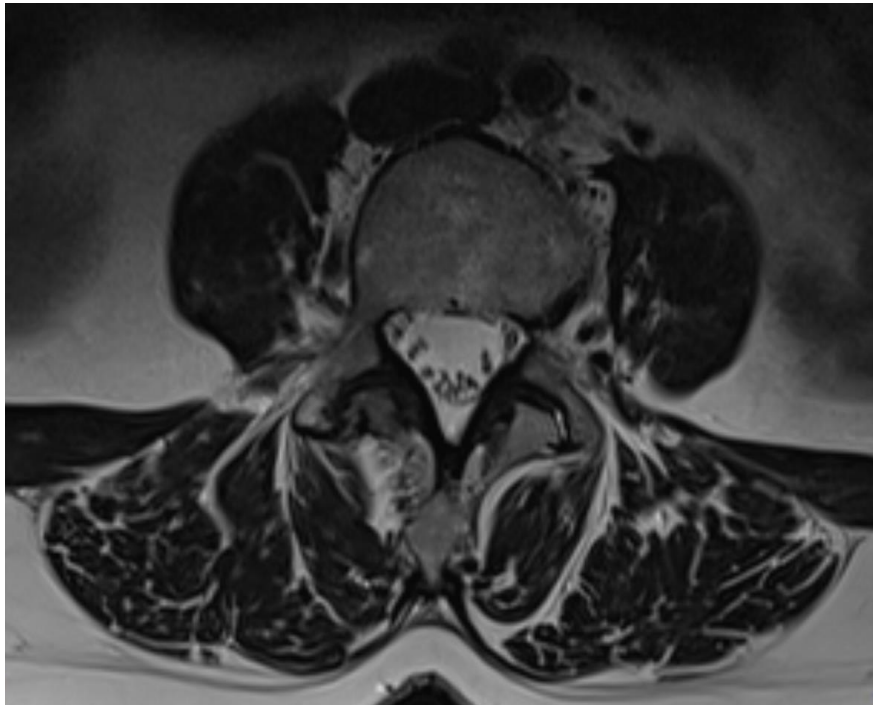


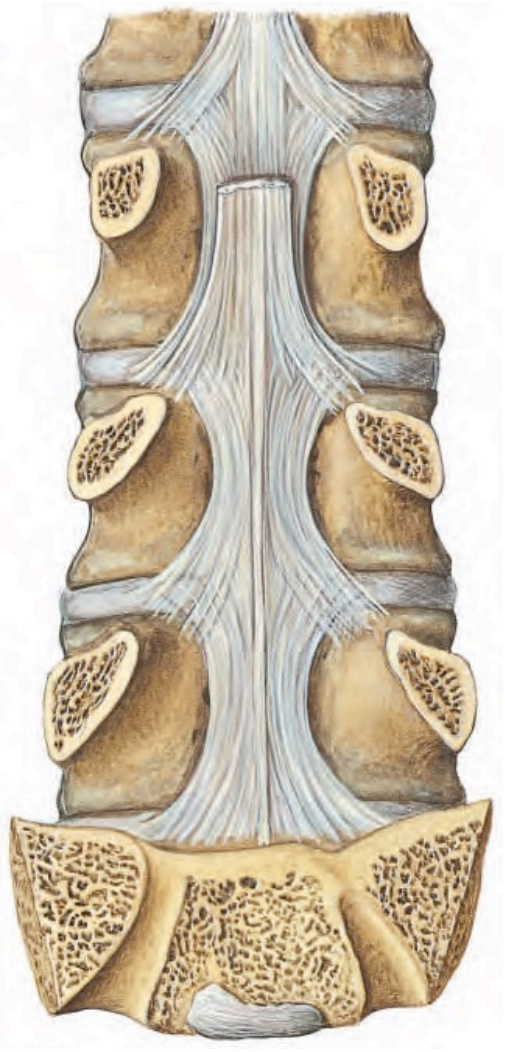




Ligamenta longitudinalia

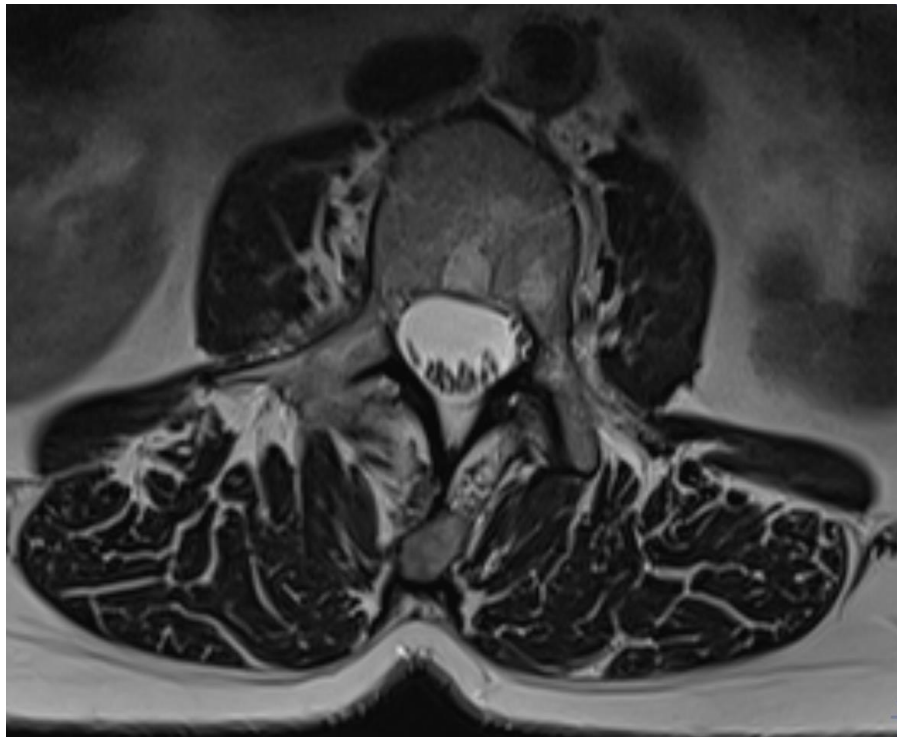
- Ligamentum longitudinale anterius
- Ligamentum longitudinale posterius

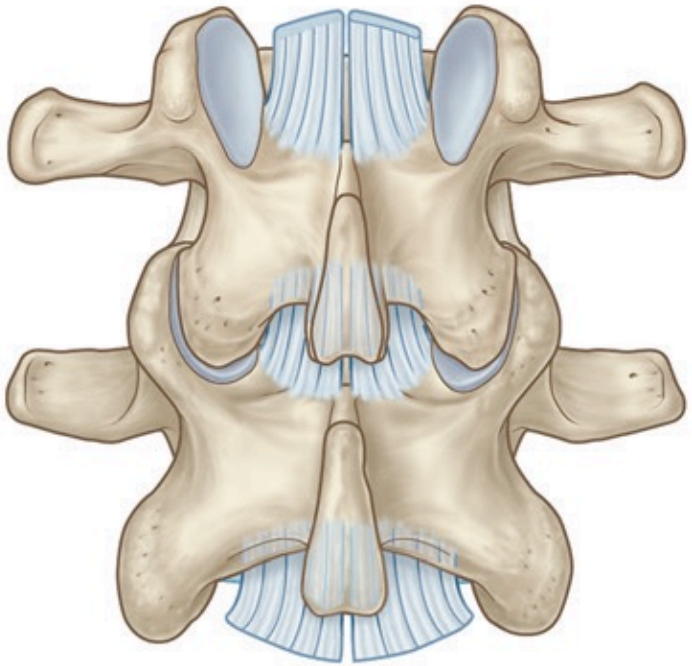


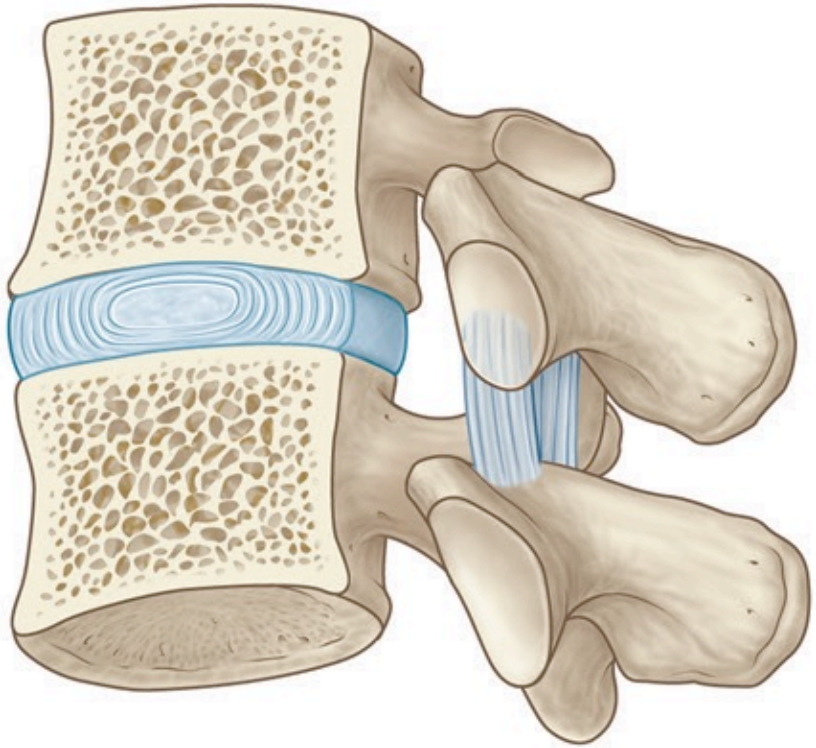


Ligamenta flava

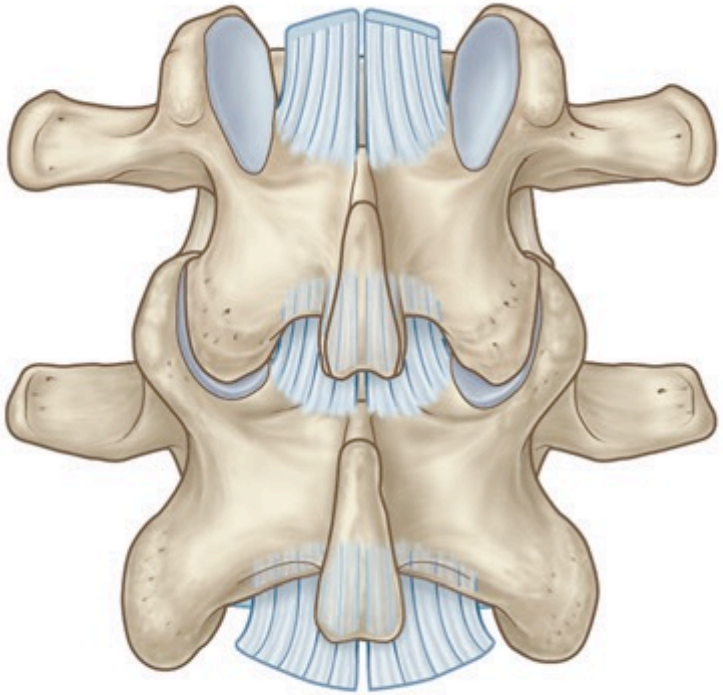
- Ligamenta flava
  - Thin and broad
  - Elastic
  - Recoiling

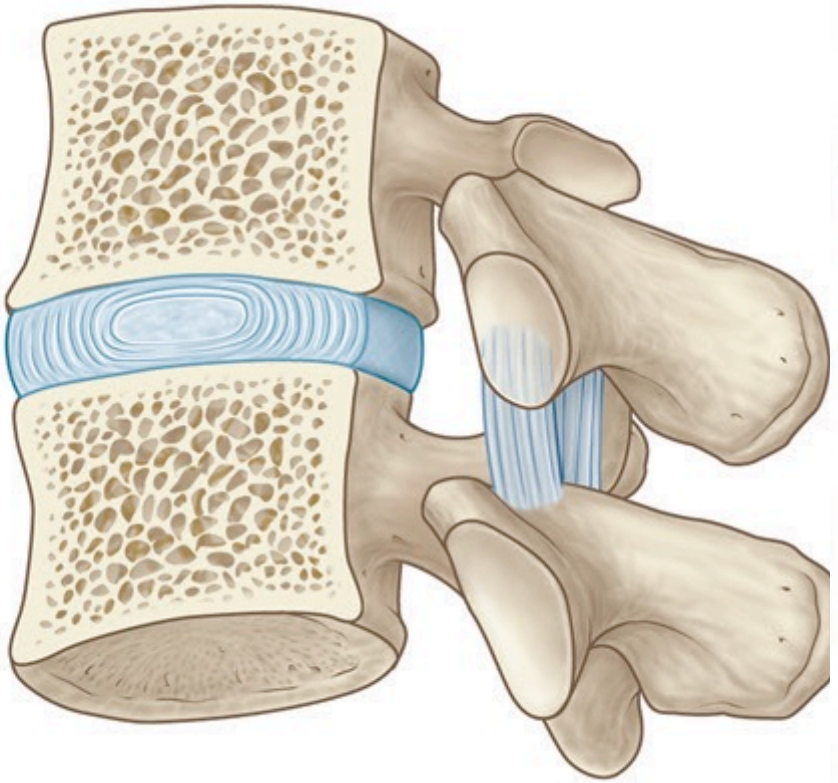


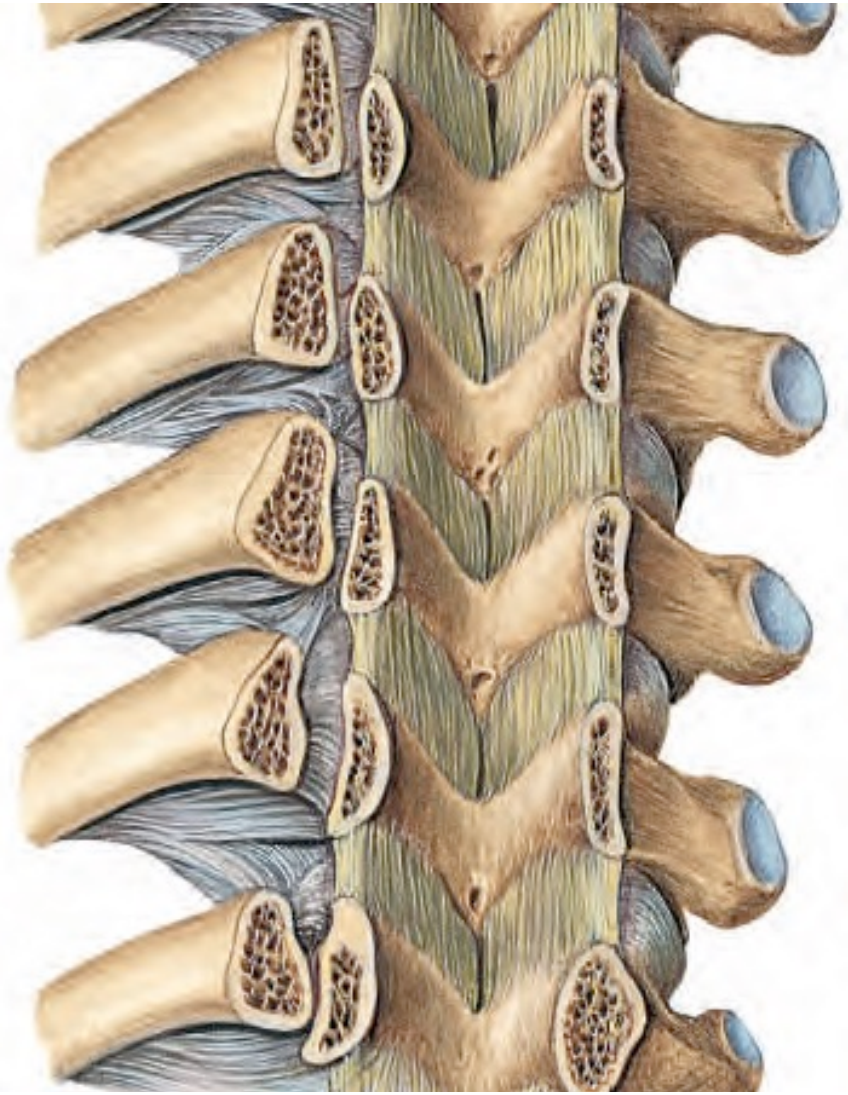




Ligamenta flava



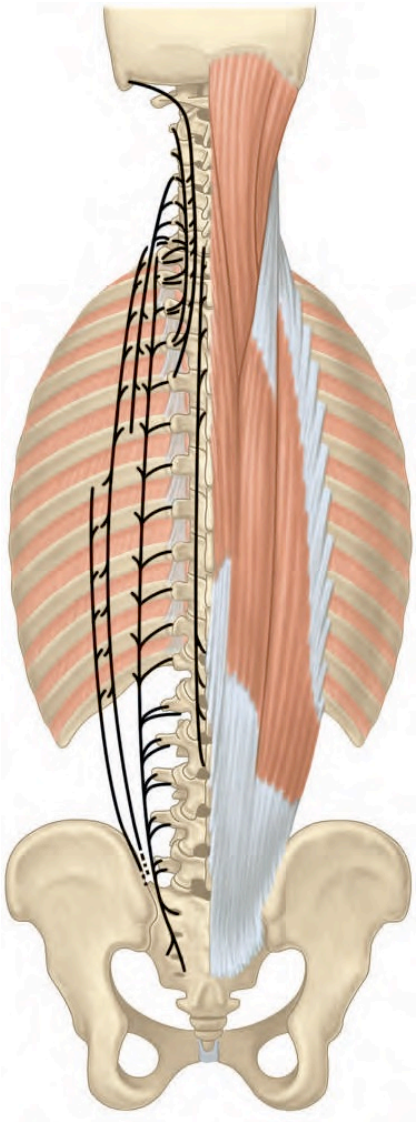


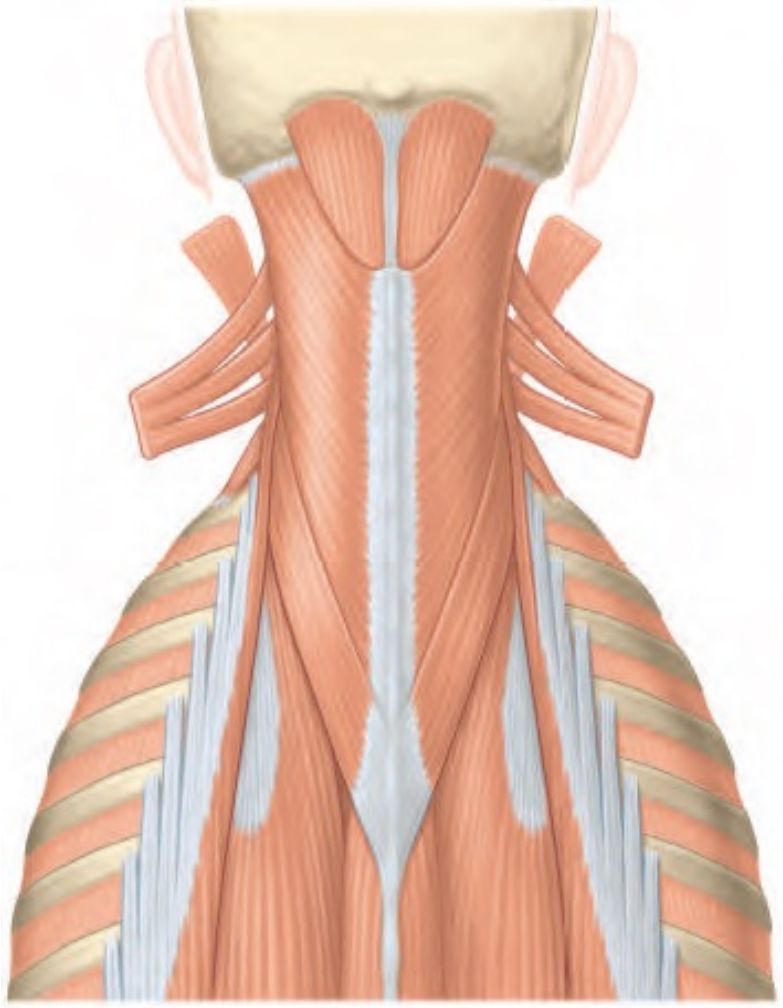


Back muscles

- **Deep group - intrinsic**
- **Intervated by**
  - *Nervi spinales, rami dorsales*

  - **M. suboccipitalis**
  - **M. splenius**
  - **M. erector spinae longissimus**
  - **M. erector spinae spinalis**
  - **M. erector spinae iliocostalis**



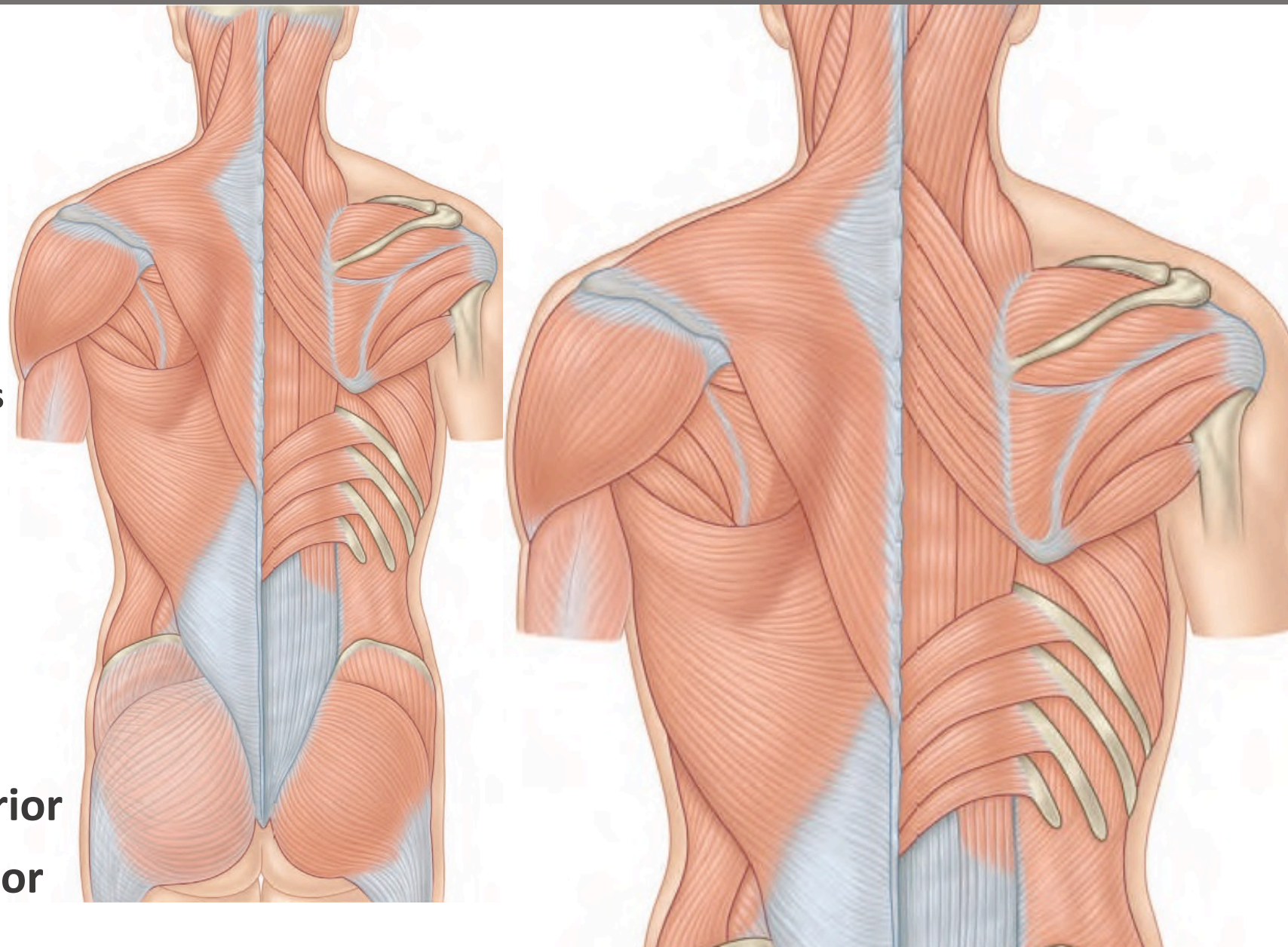


Back muscles – superficial group

- **Accessory muscles**
- **Superficial group**

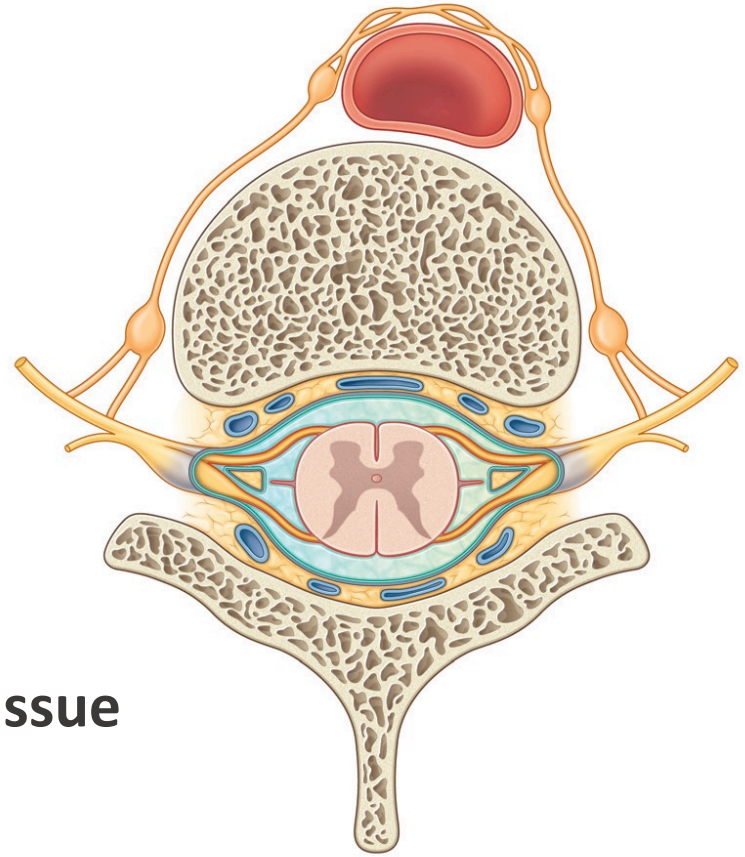
- **Inervation**
  - n. accesorius (XI. N)
  - nervi spinales, rr. Anteriores

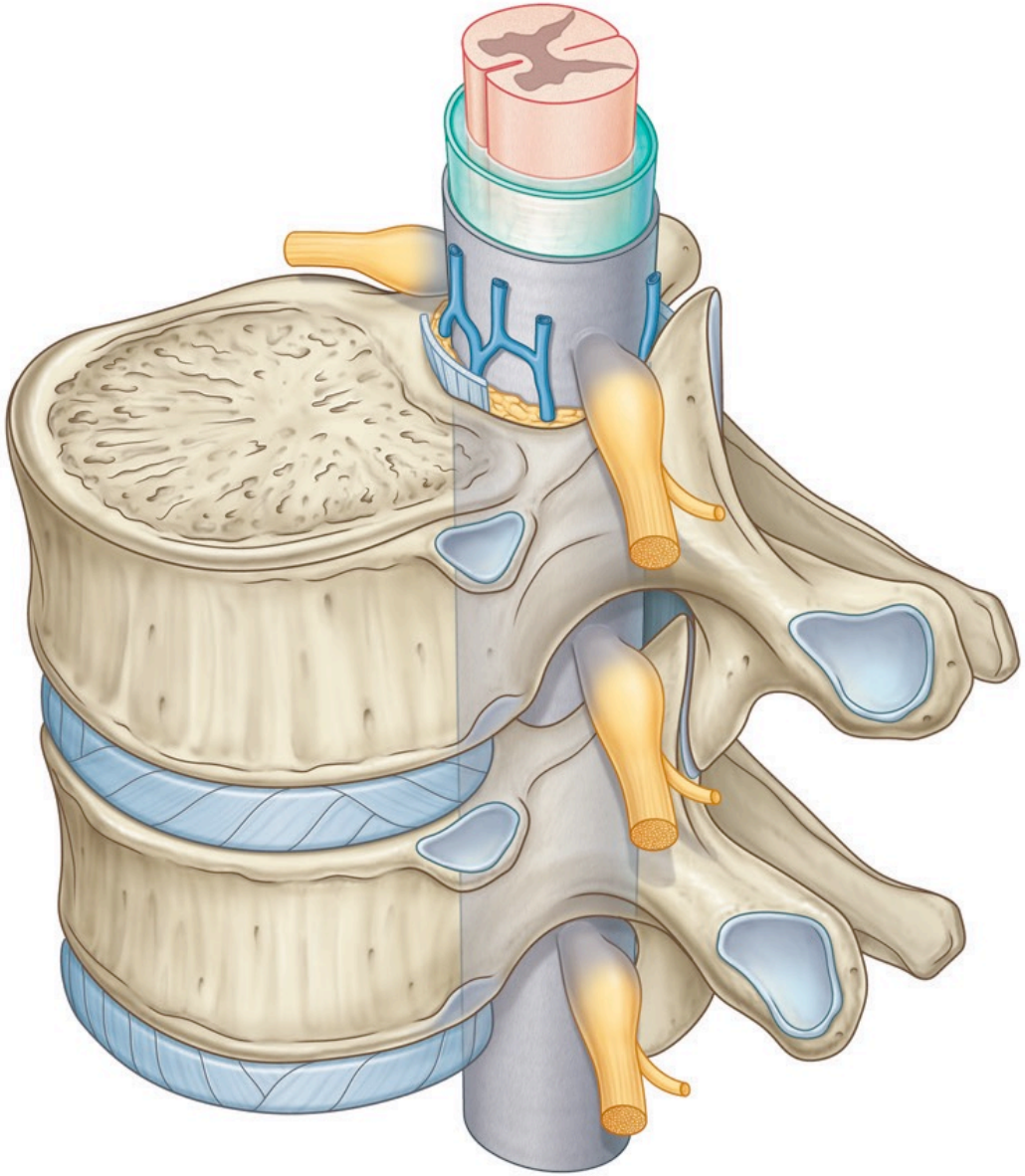
- M. trapezius
- M. levator scapulae
- M. rhomboideus minor
- M. rhomboideus maior
- M. serratus posterior superior
- M. serratus posterior inferior



Canalis vertebralis

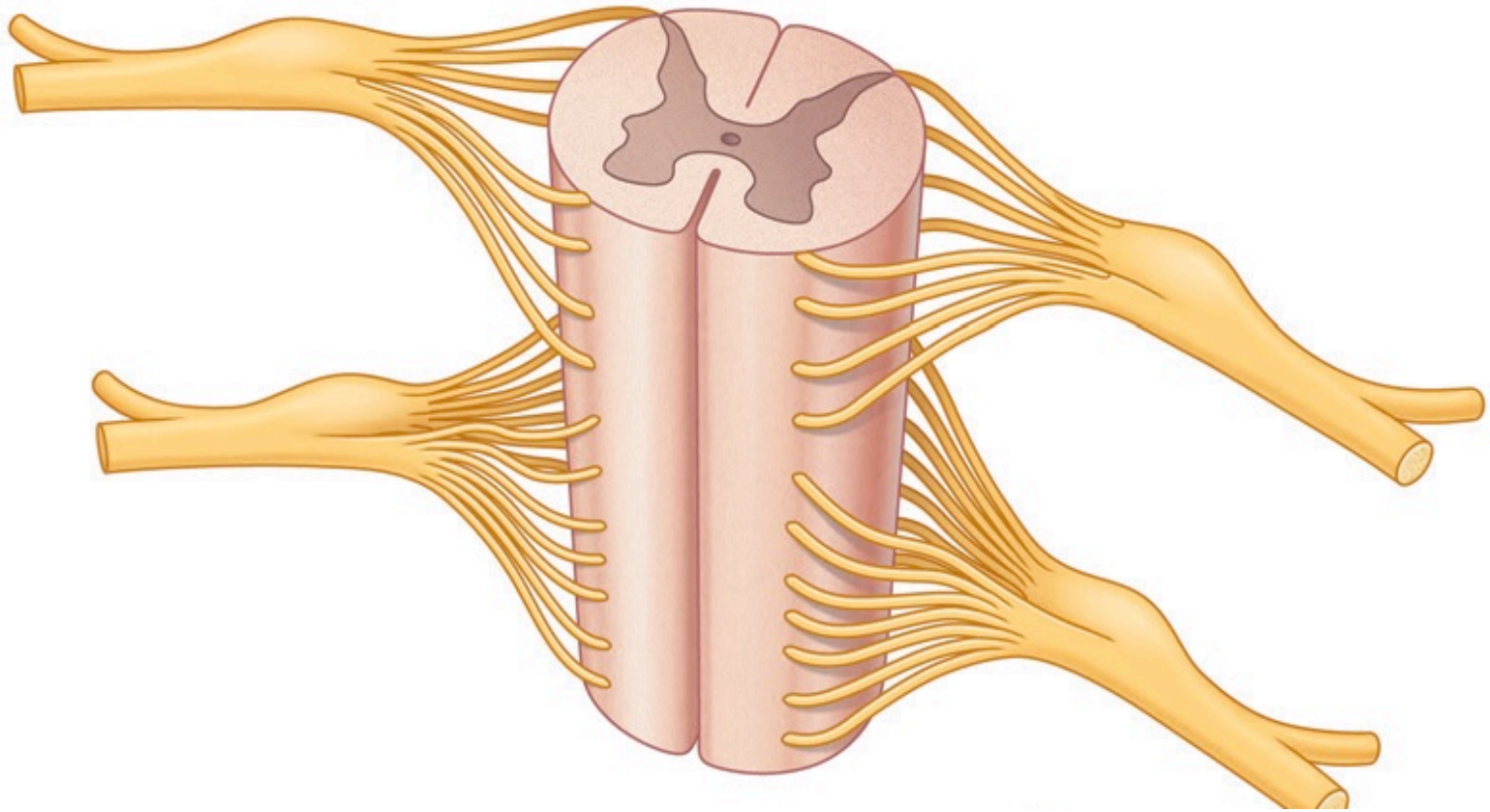
- Anteriotr– vertebral body, and disc
- Posterior - arch, ligaments
  - „bony channel“
- Medulla spinalis
- Meninges
  - Pia mater
  - Arachnoidea
  - Dura mater
- Epidural space
  - Loose conenctiv tissue
  - Fatty tissue
  - Venous plexus





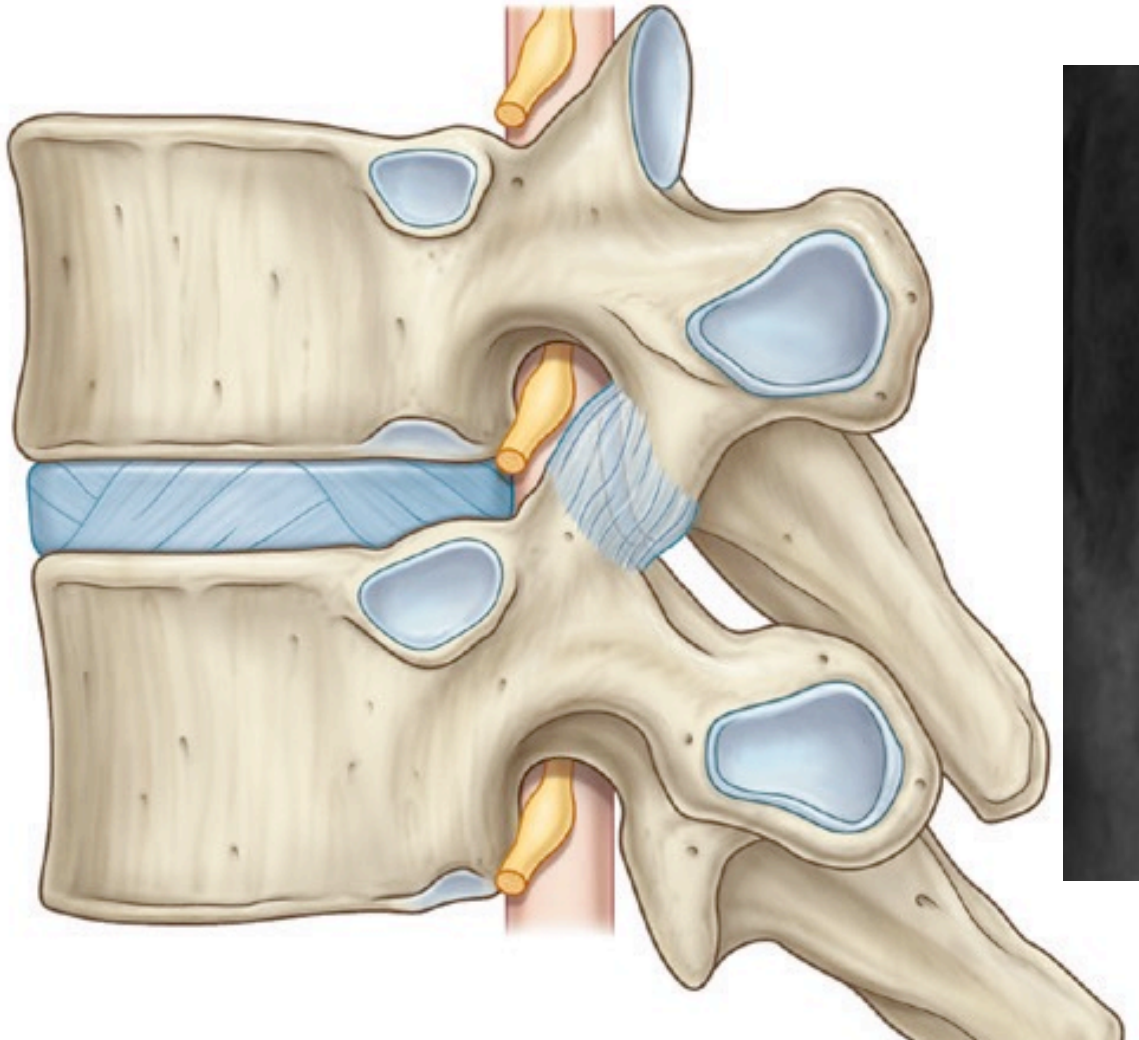
Nervi spinales

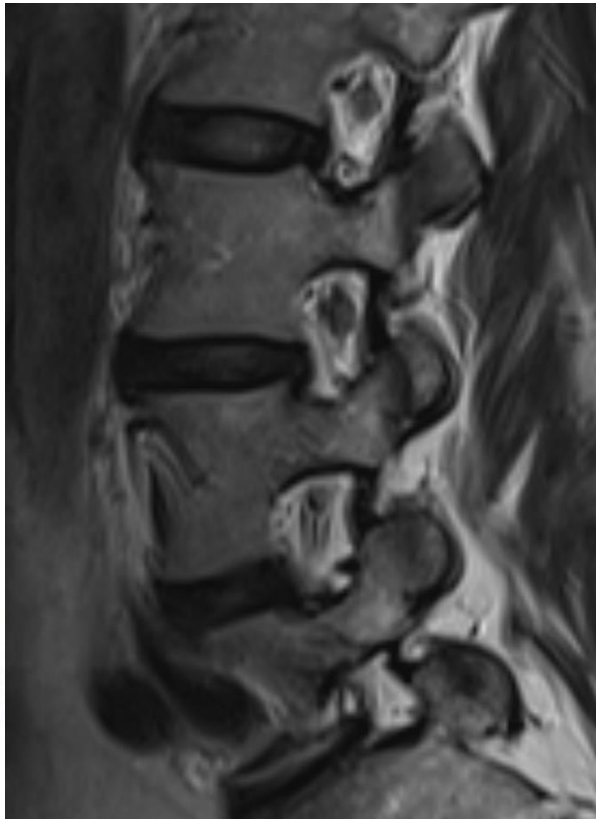
- **31 paires**
- **radix posterior - posterior root**
  - *Neuronal body in ganglion spinale (neural crest cell)*
  - *Snsitive fibers*
  - *afferent*
- **radix anterior - anterior root**
  - *Neurones in anterior horns*
  - *Motor fibers*
  - *efferent*
- **Rami nervi spinalis**
  - *Ramus posterior*
  - *Ramus anterior*
  - *Rami meningeales*



Foramen intervertebrale

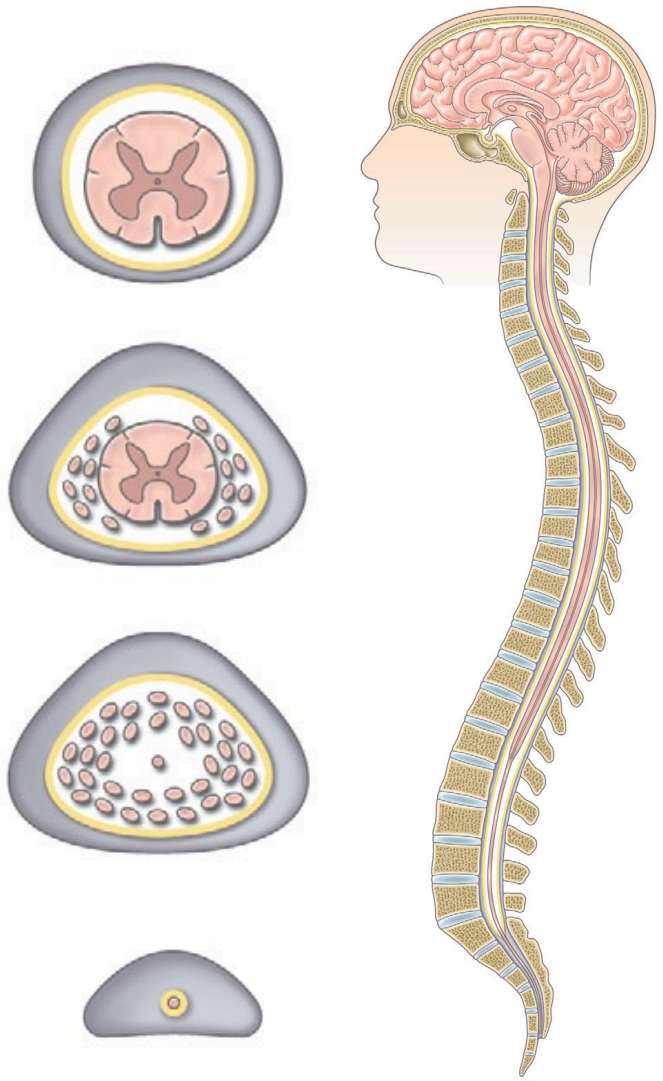
- **Spinal nerve exits the spinal channel**
- **Foramen intervertebrale**
  - **Upper and lower margin**
    - *neighboring pedicles*
  - **Dorsal margin**
    - *Intervertebral joint*
  - **Ventral margin**
    - *Vertebral body*
    - *Intervertebral disk*

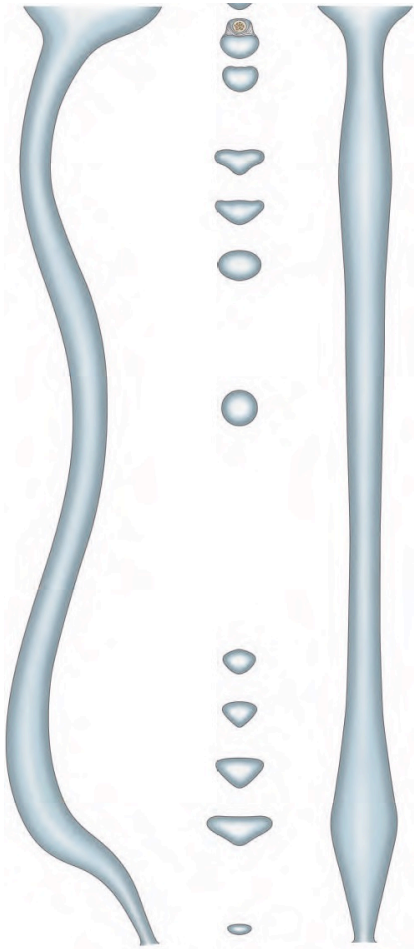




Canalis spinalis

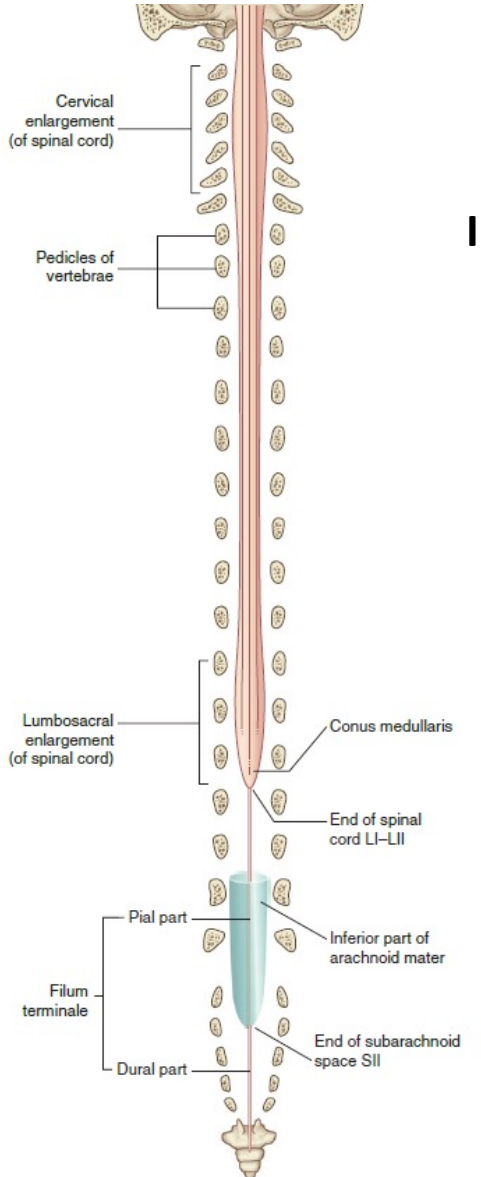
- bony
- soft
- Epidural space
- Dural sac
- Subdural space
- Spinal cord and roots
- Philum terminale

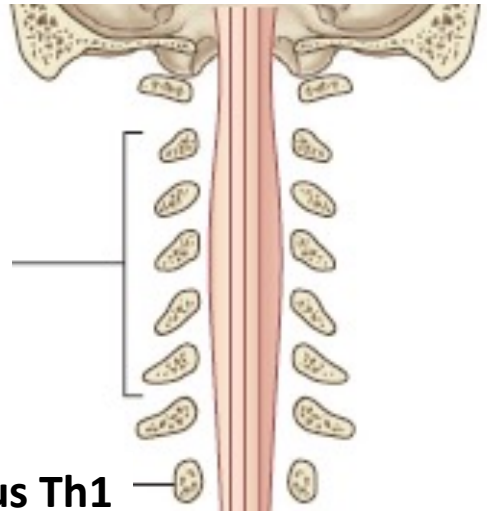


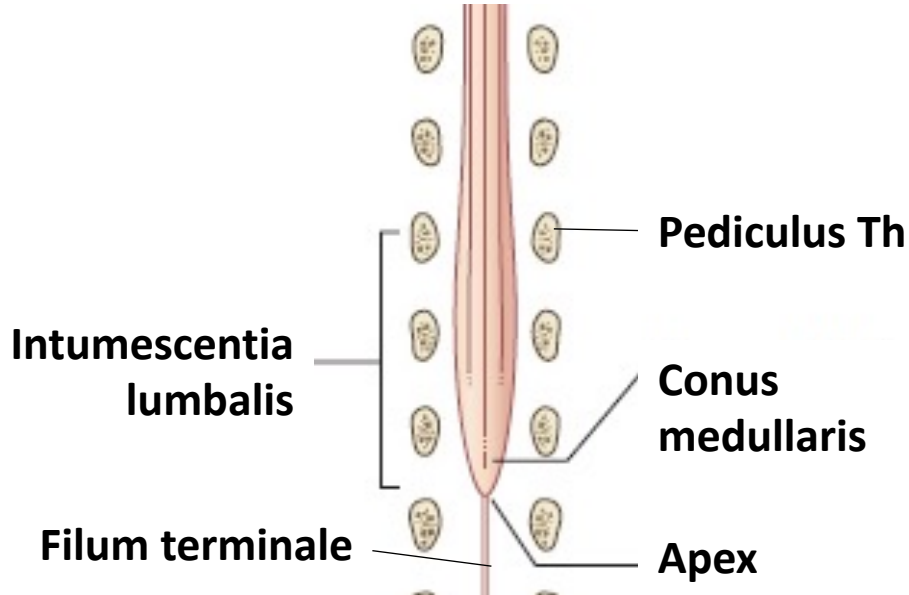


Medulla spinalis

- Rozsah
  - Foramen magnum - L1/2
  -
  - Cave! – newborn L3
- Irregular transverse area
- Intumescentia cervicalis
  - segmentsC5 - Th1
  - vertebrae C2- C7
- Intumescentia lumbalis
  - segmentsL1 - S3
  - vertebrae Th12 - L2
- Conus medullaris
- Phillum terminale



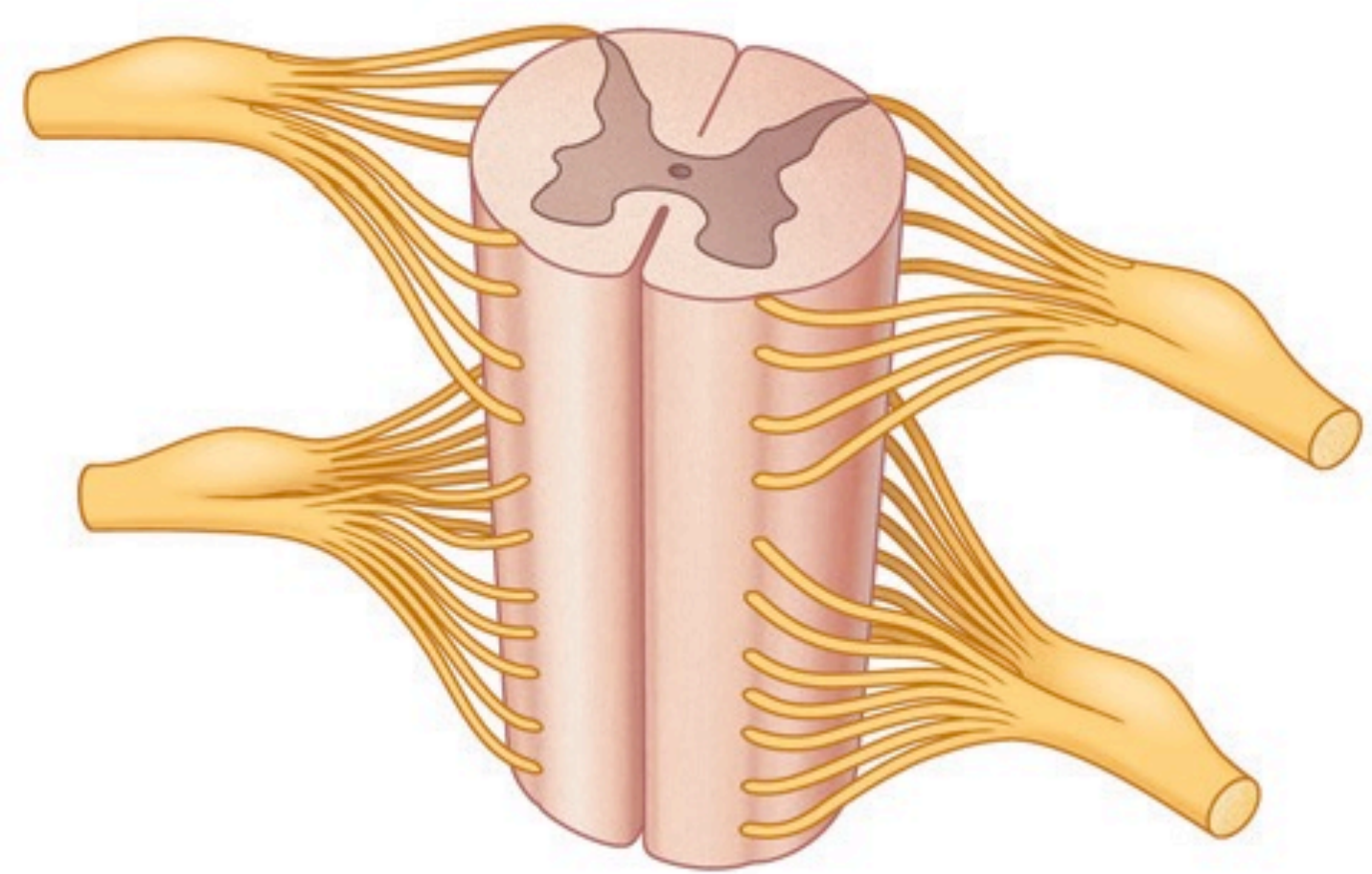




Substantia alba et grissea

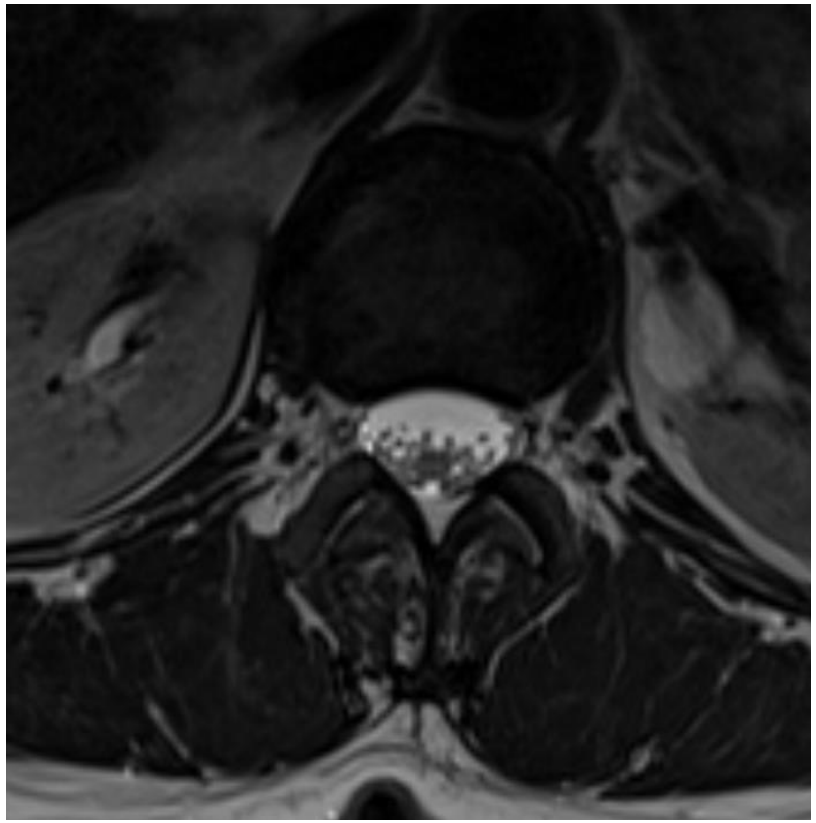
- **Substantia grissea (grey matter)**
  - *cetrally*
  - *H-letter or butterfly*
  - *Rich of neuronal bodies*
  - *columnae (cornua)*
  - *anterior, lateralis, posterior*

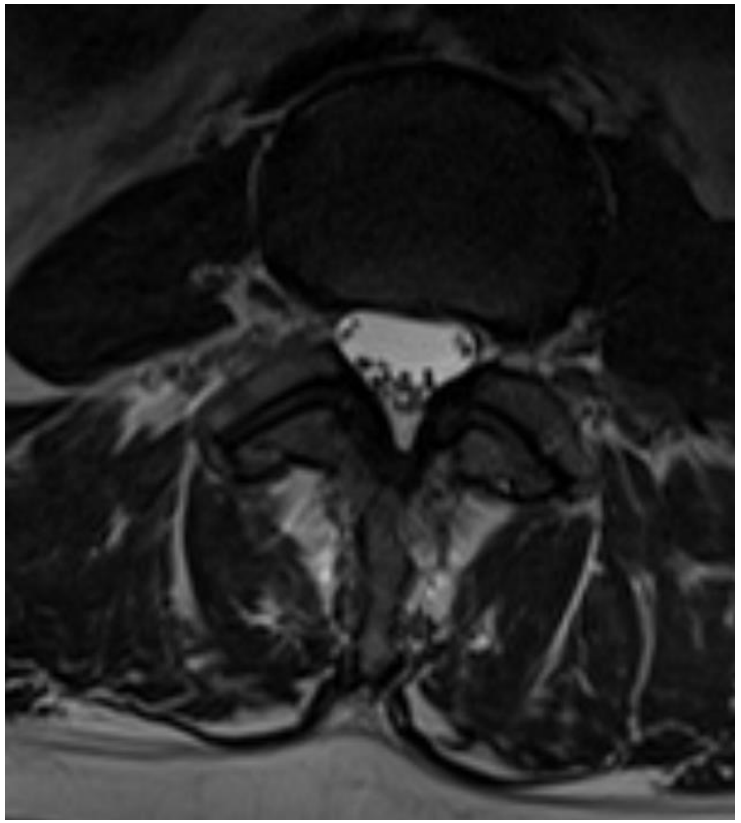
- **Substantia alba (white matter)**
  - *peripherally*
  - *Surrounding grey matter*
  - *Nejužší kolem zadních rohů*
  - *Reach of neuronal processus*
  - *Fasciculi=funiculi*
  - *Tractus*

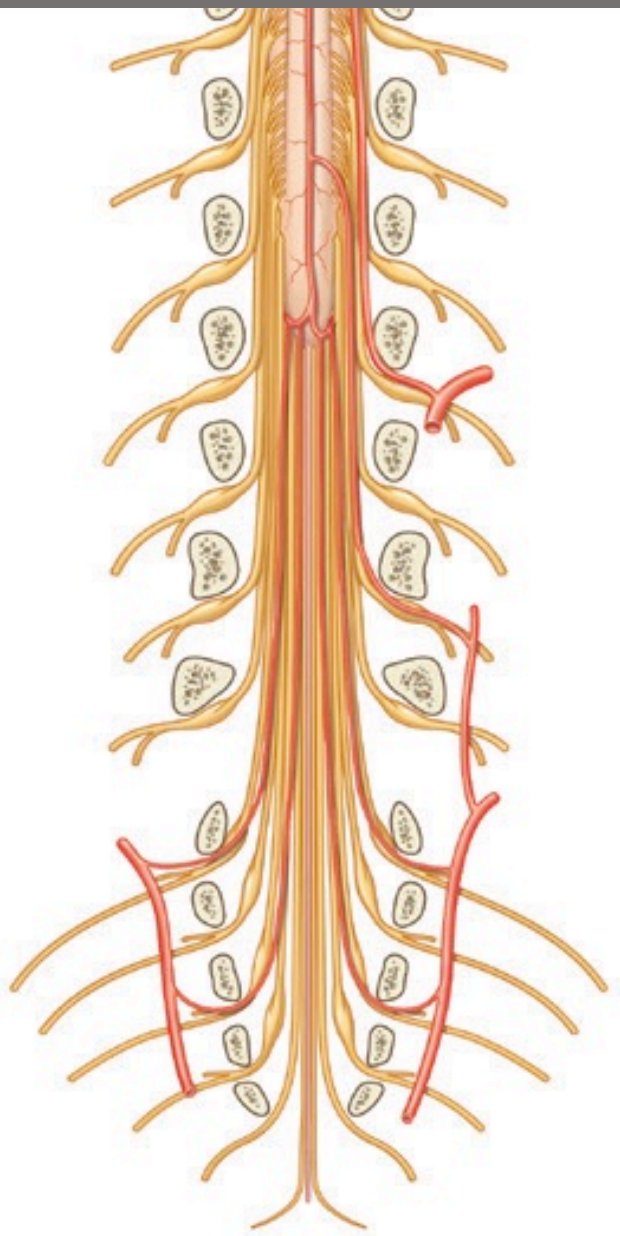


Cauda equina

- Distally to conus medullaris
- In subarachnoidal space

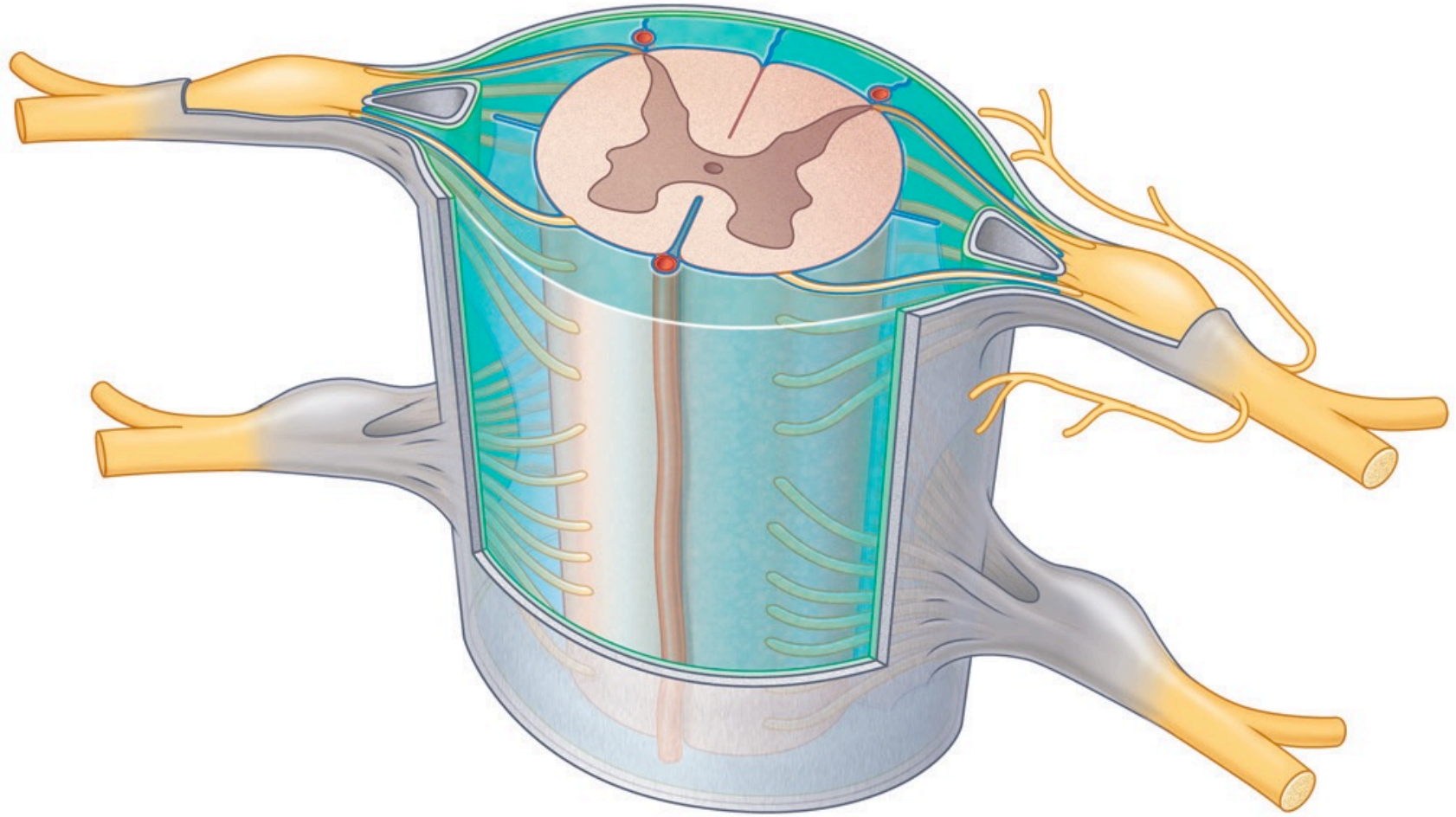






Meninges

- **Dura mater**
- **Arachnoidea**
- *Liquor cerebrospinalis*
- **Pia mater**
- *Medulla spinalis*



Dorsum – back

Prof. MUDr. Jiří Ferda, Ph.D.